CUSHMAN™

TITAN LD
Owner's Guide

631985

ISSUED JANUARY 2013

WELCOME

Thank you for purchasing this vehicle. Before driving the vehicle, we ask you to spend some time reading this Owner's Guide. This guide contains the information that will assist you in maintaining this highly reliable vehicle. Some illustrations may show items that are optional for your vehicle. This guide covers the operation of several vehicles; therefore, some illustrations may not represent your vehicle. Physical differences in controls will be illustrated.

Most of the service procedures in this guide can be accomplished using common, automotive hand tools. Contact your service representative on servicing the vehicle in accordance with the Periodic Service Schedule.

Repair or replacement parts are available through your CUSHMAN retailer or Genuine CUSHMAN Service Parts.

The following information is needed when contacting CUSHMAN concerning service or parts for your vehicle:

Vehicle Model _____

VIN or Serial Number _____

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

TITAN LD OWNER'S GUIDE
36V ELECTRIC POWERED VEHICLE

TITAN LD 2 PASSENGER

STARTING MODEL YEAR 2013

Never modify the vehicle in any way that will alter the weight distribution of the vehicle, decrease its stability or increase the speed beyond the factory specifications. Such modifications can cause serious personal injury or death. E-Z-GO Division of Textron Inc. prohibits and disclaims responsibility for any such modifications or any other alteration which would adversely affect the safety of the vehicle.

E-Z-GO Division of Textron Inc. reserves the right to incorporate engineering and design changes to products in this manual, without obligation to include these changes on units sold previously.

The information contained in this manual may be revised periodically by E-Z-GO, and therefore is subject to change without notice.

E-Z-GO DISCLAIMS LIABILITY FOR ERRORS IN THIS MANUAL, and SPECIFICALLY DISCLAIMS LIABILITY FOR INCIDENTAL AND CONSEQUENTIAL DAMAGES resulting from the use of the information and materials in this Manual.

These are the original instructions as defined by 2006/42/EC.

TO CONTACT US

CUSHMAN
1451 Marvin Griffin Road.
Augusta, Georgia, 30906-3852
USA

E-mail: Cushmancomm@textron.com

North America:
Technical Assistance & Warranty PHONE: 1-800-774-3946 FAX: 1-800-448-8124
Service Parts PHONE: 1-888-438-3946 FAX: 1-800-752-6175
International:
PHONE: 001-706-798-4311 FAX: 001-706-771-4609

FOREWORD

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

The use of non-Original Equipment Manufacturer (OEM) approved parts may void the warranty.

Failure to properly maintain batteries may void the warranty. Refer to the battery manual for instructions on the proper maintenance and care of the batteries.

BATTERY PROLONGED STORAGE

All batteries will self-discharge over time. The rate of self-discharge varies depending on the ambient temperature, the age and condition of the batteries.

A fully charged battery will not freeze in winter temperatures unless the temperature falls below -75°F (- 60°C).

For winter storage, the batteries must be clean, fully charged and disconnected from any source of electrical drain.

An on-board charger may be left plugged into an AC power source to maintain a full charge on the batteries. A portable battery charger may be left connected to the vehicle to maintain a full charge on the batteries, provided the charger is plugged into an active electrical source. With a portable charger, if power to the electrical source is disconnected or interrupted the battery charger will continue to check the charge on the battery pack, this will draw power from the battery pack and eventually drain the batteries if power is not restored in a timely manner.

As with all electric vehicles, the batteries must be checked and recharged as required or at a minimum of 30 day intervals.

Remember to check and maintain the proper fluid level in all battery cells during the storage period; proper fluid level is required for maximum battery performance.

BATTERY DISPOSAL

Lead-acid batteries are recyclable. Return whole scrap batteries to distributor, manufacturer or lead smelter for recycling. For neutralized spills, place residue in acid-resistant containers with absorbent material, sand or earth and dispose of in accordance with local, state and federal regulations for acid and lead compounds. Contact local and/or state environmental officials regarding disposal information.

TABLE OF CONTENTS

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

TITLE	PAGE NO.
SAFETY	1-1
GENERAL SPECIFICATIONS	2-1
INTRODUCTION	3-1
OPERATING PROCEDURES	4-1
MAINTENANCE	5-1
DELTA Q CHARGER INSTRUCTIONS	APPENDIX A-1
DELCARATION OF CONFORMITY	APPENDIX B-1

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

Notes:

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

TITLE	PAGE NO.
GENERAL	1-2
NOTICES, CAUTIONS, WARNINGS, AND DANGERS	1-2
GENERAL OPERATION	1-3
MAINTENANCE	1-5
VENTILATION	1-6
LABELS AND PICTOGRAMS	1-7

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

GENERAL

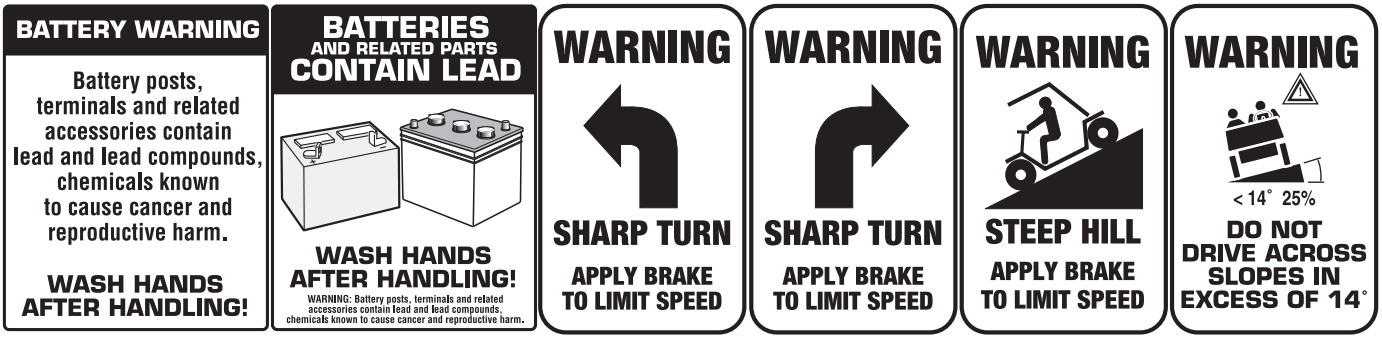
For any questions on material contained in this manual, contact an authorized representative for clarification.

Read all labels located on the vehicle. Always replace any damaged or missing labels.

On steep hills it is possible for vehicles to coast at greater speeds. To prevent loss of vehicle control and possible serious injury, speeds should be limited to no more than the maximum speed on level ground. See GENERAL SPECIFICATIONS. Limit speed by applying the service brake.

Catastrophic damage to the drivetrain components due to excessive speed may result from driving the vehicle above specified speed. Damage caused by excessive speed may cause a loss of vehicle control, is costly, is considered abuse and will not be covered under warranty.

Use extra caution when towing the vehicle. Do not tow a single vehicle at speeds in excess of 12 mph (19 kph). If the vehicle is to be used in a commercial environment, signs similar to the ones illustrated should be used to warn of situations that could result in an unsafe condition.


BATTERY WARNING
Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to cause cancer and reproductive harm.
WASH HANDS AFTER HANDLING!
BATTERIES AND RELATED PARTS CONTAIN LEAD
WASH HANDS AFTER HANDLING!
WARNING: Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to cause cancer and reproductive harm.
WARNING
SHARP TURN
APPLY BRAKE TO LIMIT SPEED
WARNING
SHARP TURN
APPLY BRAKE TO LIMIT SPEED
WARNING
STEEP HILL
APPLY BRAKE TO LIMIT SPEED
WARNING
< 14° 25%
DO NOT DRIVE ACROSS SLOPES IN EXCESS OF 14°

NOTICES, CAUTIONS, WARNINGS, AND DANGERS

Throughout this guide **NOTICE, CAUTION, WARNING,** and **DANGER** will be used. Please observe these **NOTICES, CAUTIONS, WARNINGS,** and **DANGERS;** be aware that servicing a vehicle requires mechanical skill and a regard for conditions that could be hazardous. Improper service or repair may damage the vehicle or render it unsafe.

NOTICE

Address practices not related to personal injury.

⚠ CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

⚠ WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

This manual has been designed to assist in maintaining the vehicle in accordance with procedures developed by the manufacturer. Adherence to these procedures and troubleshooting tips will ensure the best possible service from the product. To reduce the chance of personal injury or property damage, the following must be carefully observed:

⚠ CAUTION

Certain replacement parts can be used independently and/or in combination with other accessories to modify an E-Z-GO-manufactured vehicle to permit the vehicle to operate at or in excess of 20 mph. When an E-Z-GO-manufac-

tured vehicle is modified in any way by the Distributor, Dealer or customer to operate at or in excess of 20mph, UNDER FEDERAL LAW the modified product will be a Low Speed Vehicle (LSV) subject to the strictures and requirements of Federal Motor Vehicle Safety Standard 571.500. In these instances, pursuant to Federal law the Distributor or Dealer MUST equip the product with headlights, rear lights, turn signals, seat belts, top, horn and all other modifications for LSV's mandated in FMVSS 571.500, and affix a Vehicle Identification Number to the product in accordance with the requirements of FMVSS 571.565. Pursuant to FMVSS 571.500, and in accordance with the State laws applicable in the places of sale and use of the product, the Distributor, Dealer or customer modifying the vehicle also will be the Final Vehicle Manufacturer for the LSV, and required to title or register the vehicle as mandated by State law.

E-Z-GO will NOT approve Distributor, Dealer or customer modifications converting E-Z-GO products into LSV's.

The Company recommends that all E-Z-GO products sold as personal transportation vehicles BE OPERATED ONLY BY PERSONS WITH VALID DRIVERS LICENSES, AND IN ACCORDANCE WITH APPLICABLE STATE REQUIREMENTS. This restriction is important to the SAFE USE AND OPERATION of the product.

All customers should adhere to this SAFETY RESTRICTION, in connection with the use of all E-Z-GO products, new and used, the Distributor or Dealer has reason to believe may be operated in personal transportation applications.

Information on FMVSS 571.500 can be obtained at Title 49 of the Code of Federal Regulations, section 571.500, or through the Internet at the web site for the U.S. Department of Transportation - at Dockets and Regulation, then to Title 49 of the Code of Federal Regulations (Transportation).

All vehicles can be used for a variety of tasks beyond the original intended use of the vehicle; therefore, it is impossible to anticipate and warn against every possible combination of circumstances that may occur. No warning can take replace good common sense and prudent driving practices.

Good common sense and prudent driving practices do more to prevent accidents and injury than all of the warnings and instructions combined. E-Z-GO strongly suggests that all users and maintenance personnel read this entire manual paying particular attention to the CAUTIONS, WARNINGS and DANGERS contained therein.

If you have any questions regarding this vehicle, contact your E-Z-GO/CUSHMAN dealer or write to the address on the back cover of this publication, Attention: Customer Care Department.

E-Z-GO reserves the right to make design changes without obligation to make these changes on units previously sold. The information contained in this manual is subject to change without notice.

E-Z-GO IS NOT LIABLE FOR ERRORS IN THIS MANUAL. E-Z-GO IS NOT LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES THAT RESULT FROM THE USE OF THE MATERIAL IN THIS MANUAL.

This vehicle conforms to the current applicable standard(s) for safety and performance requirements.

These vehicles are designed and manufactured for off-road use. They DO NOT conform to Federal Motor Vehicle Safety Standards of the United States of America (USA) and are not equipped for operation on public streets. Some communities may permit these vehicles to be operated on their streets on a limited basis and in accordance with local ordinances.

With electric powered vehicles, be sure that all electrical accessories are grounded directly to the battery (-) post. **Never use the chassis or body as a ground connection.**

Refer to GENERAL SPECIFICATIONS for vehicle seating capacity.

⚠ WARNING

Never modify the vehicle in any way that will alter the weight distribution of the vehicle, decrease its stability, or increase the speed or extend the stopping distance beyond the factory specification. Such modifications can result in serious personal injury or death.

Do not make any such modifications or changes. E-Z-GO prohibits and disclaims responsibility for all such modifications or and alterations which would adversely affect the safety of the vehicle.

Some models may be certified as a Type E or Type EE vehicle from the factory, any modification to one of these vehicles may void the certification.

Vehicles that are capable of higher speeds must limit their speed to no more than the speed of other vehicles when used in a golf course environment. Additionally, speed should be further moderated by the environmental conditions, terrain and common sense.

Operation of the vehicle is limited to persons above the height of 59 inches (150 cm).

1

GENERAL OPERATION

Read the following warnings before attempting to operate the vehicle.

⚠ WARNING

To prevent personal injury or death, observe the following:

When vehicle is to be left unattended, set park brake, turn key to OFF position AND REMOVE KEY.

Drive vehicle only as fast as terrain and safety considerations allow. Consider the terrain and traffic conditions. Consider environmental factors which affect the terrain and the ability to control the vehicle.

Avoid driving fast downhill. Sudden stops or change of direction may result in a loss of control. Use brake to control speed when traveling down an incline.

Use extra care and reduced speed when driving in poor conditions or on poor surfaces.

Stay in designated areas where provided and avoid steep slopes.

Keep feet, legs, hands, and arms inside vehicle at all times.

Avoid extremely rough terrain.

Check area behind the vehicle before operating in reverse.

Make sure the direction selector is in correct position before depressing the accelerator pedal.

Slow down before and during turns.

Always bring vehicle to a complete stop before shifting the direction selector.

See GENERAL SPECIFICATIONS for vehicle load and seating capacity.

NOTICE

Read the following text and warnings before attempting to service vehicle.

In any product, components may eventually fail to perform properly as the result of normal use, age, wear, or abuse.

It is impossible to anticipate all possible component failures or the manner in which each component may fail.

A vehicle requiring repair is no longer functioning as designed and therefore could be potentially hazardous. Therefore, use extreme care when working on any vehicle. When diagnosing, removing, or replacing any components that are not operating correctly, take time to consider the safety of yourself and others around you.

Some components are heavy, spring-loaded, highly corrosive, explosive, may produce high amperage, or reach high temperatures. Exposure to battery acid and hydrogen gas could result in serious bodily injury. Be careful to protect hands, face, feet, and body from injury.

Always use the appropriate tools listed in the tool list and wear approved safety equipment.

⚠ WARNING

Before working on the vehicle, remove all jewelry.

Be sure no loose clothing or hair can contact moving parts.

Use care not to touch hot objects.

Wear eye protection when working on or around the vehicle. In particular, use care when working around batteries, using solvents or compressed air.

Hydrogen gas is formed when charging batteries. Do not charge batteries without adequate ven-

tilation.

Do not permit open flame or anyone to smoke in an area that is being used for charging batteries.

Do not charge the vehicle batteries in a hazardous location or atmosphere. Refer to NFPA 505 for definitions of hazardous and non-hazardous locations.

ALWAYS:

- use the vehicle in a responsible manner and maintain the vehicle in safe operating condition
- read and observe all warnings and operation instruction labels affixed to the vehicle
- follow all safety rules established in the area where the vehicle is being operated
- Leave the vehicle when there is a risk of lightning.
- reduce speed to compensate for poor terrain or conditions
- apply service brake to control speed on steep grades
- maintain adequate distance between vehicles
- reduce speed in wet areas
- use extreme caution when approaching sharp or blind turns
- use extreme caution when driving over loose terrain
- use extreme caution in areas where pedestrians are present

MAINTENANCE

ALWAYS:

- replace damaged or missing warning, caution or information labels
- maintain the vehicle in accordance with the manufacturer's periodic service schedule
- ensure that repairs are performed by trained and qualified personnel
- follow the manufacturer's maintenance procedures
- insulate any tools used within the battery area in order to prevent sparks or battery explosion
- check the polarity of each battery terminal and be sure to rewire the batteries correctly
- use specified replacement parts, NEVER use replacement parts of lesser quality
- use recommended tools
- determine that tools and procedures not specifically recommended by the manufacturer will not compromise the safety of personnel nor jeopardize the safe operation of the vehicle
- support the vehicle using wheel chocks and jack stands, NEVER get under a vehicle that is supported by a jack, lift the vehicle in accordance with the manufacturer's instructions
- maintain the vehicle in an area away from exposed flame or persons who are smoking
- be aware that a vehicle that is not performing as designed is a potential hazard and must not be operated
- test drive the vehicle after any repairs or maintenance in a safe area that is free of both vehicular and pedestrian traffic
- keep complete records of the maintenance history of the vehicle

VENTILATION

ALWAYS:

- charge the vehicle in a well-ventilated, non-hazardous area
- charge in an area free of flammable liquids and items
- charge a vehicle in an area that is free from flame or spark, pay particular attention to natural gas or propane water heaters and furnaces
- use a dedicated 15-amp circuit for each battery charger, DO NOT permit other appliances to be plugged into the receptacle when the charger is in operation
- operate the charger in accordance with manufacturers recommendations or applicable electrical code

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

LABELS AND PICTOGRAMS

827664

WARNING

FAILURE TO HEED THESE WARNINGS MAY RESULT IN PERSONAL OR FATAL INJURY TO YOU OR OTHERS AND MAY ALSO RESULT IN EQUIPMENT AND/OR PROPERTY DAMAGES.

READ, STUDY AND UNDERSTAND ALL WARNING LABELS AND OPERATING INSTRUCTIONS FURNISHED WITH THIS EQUIPMENT PRIOR TO USE. IF ANY PART OF THIS MATERIAL IS UNCLEAR, CONTACT YOUR FACTORY REPRE-SENTATIVE FOR CLARIFICATION. NEVER ALLOW UNSKILLED OR IMPROPERLY TRAINED PERSONNEL TO OPERATE THIS EQUIPMENT.

BEFORE OPERATING VEHICLE

DO NOT MODIFY OR ADD TO VEHICLE WITHOUT MANUFACTURER'S AUTHORIZATION. CHECK VEHICLE CONDITION-DO NOT OPERATE IF MAINTENANCE OR REAPIRS ARE NEEDED. UNDERSTAND CONTROLS AND CHECK FUNCTIONS. KEEP CONTROLS FREE OF OBSTRUCTIONS. ALL PASSENGERS MUST BE SEATEDD IN MANUFACTURER'S APPROVED SEATS. DO NOT OPERATE IN EXPLOSIVE OR COMBUSTIBLE ATMOSPHERE-SWITCHES SPART. CARGO MUST BE SECURED TO PLATFORM/

WHILE OPERATING VEHICLE

KEEP BODY PARTS INSIDE VEHICLE. STAY IN SEAT, USE HAND HOLDS. AVOID SUDDEN STARTS, STOPS, TURNS, AND DIRECTION CHANGES TO AVOID UNSEATING PASSENGERS OR CAUSING UNSTABLE CONDITIONS. REVERSE SPEED IS EQUAL TO FORWARD SPEED ON ELECTRIC POWERED VEHICLE. VEHICLE WITH PROGRAMMAMBLE CONTROLLELR MAY HAVE SLOWER REVERSE SPEED. ADJUST OPERATION TO CONDITIONS OF CROUND, SPEED, LOAD, GRADES. ETC. MAINTAIN A SAFE DISTANCE FROM PEDESTRIANS, RAMP EDGES, PLATFORMS, ETC. OBSERVE ALL TRAFFIC REGULATIONS. OPERATE VEHICLE IN A RESPONSIBLE MANNER.

BEFORE LEAVING VEHICLE

SET DIRECTIONS SELECTOR IN "NEUTRAL". TURN KEY TO VERTICAL "OFF" POSITION AND REMOVE. IF MALFUNCTION OCCURS, OR ADJUSTMENT IS NEEDED, HAVE ALL WORK PERFORMED BY AUTHORIZED PERSONNEL. BLOCK WHEEELS IF PARKED ON INCLINE. APPLY HAND PARKING BRAKE-PARKING BRAKE NOT AUTOMATICALLY SET.

IT IS YOUR RESPONSIBILITY TO KEEP ALL LABELS (DECALS) AND INSTRUCTIONAL LITERATURE LEGIBLE AND INTACT. REPLACEMENT LABELS (DECALS) AND LITERATURE ARE AVAILABLE FROM THE FACTORY.

29165G01

WARNING

Failure to follow this warning can cause severe personal injury or death.

This vehicle is designed and constructed for OFF-ROAD USE ONLY. Do not use this vehicle on any public roadway where automobiles or other motor vehicles are present. Such use can be hazardous to the operator and other drivers, passengers or bystanders.

600945

OFF ON

4115473

CAUTION

FIRE DAMAGE MAY OCCUR TO WIRES AND ELECTRICAL COMPONENTS IF VEHICLE IS TOWED. REMOVE MOTOR LEAD CONNECTIONS IF VEHICLE IS TO BE TOWED.

4115473

825394

NOTICE

THIS VEHICLE IS EQUIPPED WITH A THROTTLE-SOLENOID INTERLOCK SYSTEM IN CASE OF POWER INTERRUPTION, RELEASE AND REAPPLY THROTTLE. (SEE OWNER'S MANUAL)

825394

830926

WARNING

READ OPERATOR'S MANUAL BEFORE OPERATING CHARGER.
DO NOT CHARGE IN EXPLOSIVE ATMOSPHERE.
DO NOT OPERATE VEHICLE WHILE CHARGING.
SPARKS MAY IGNITE BATTERY GAS (HYDROGEN).
TO PREVENT ELECTRICAL SHOCK, DO NOT USE 2-PRONG ADAPTORS.
REPLACE DAMAGED CHARGER CORDS AND WIRES IMMEDIATELY.

OPERATING INSTRUCTIONS

CONNECT CHARGER PLUG TO A GROUNDED RECEPTICLE WITH POWER RATING AS INDICATED ON CHARGER.

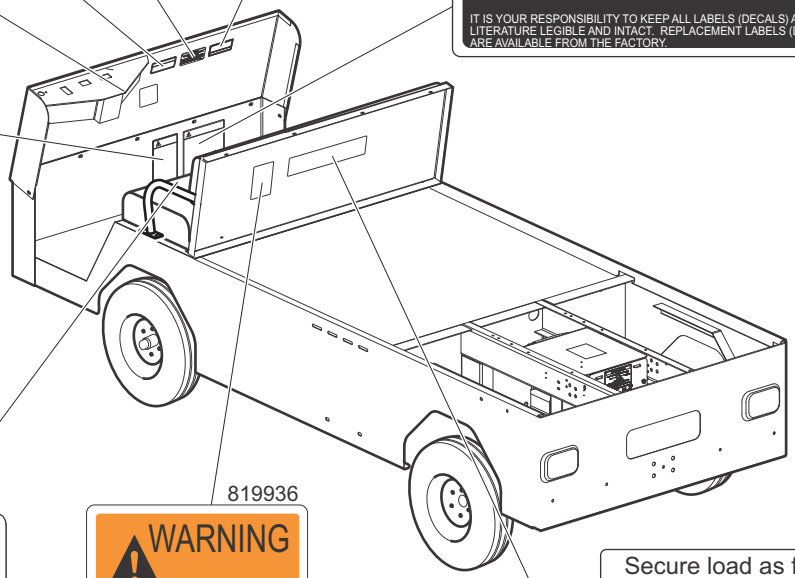
CHARGER WILL TURN ON AUTOMATICALLY.

AMMMETER SHOWS WHEN CHARGER IS OPERATING.

CHARGER SHUTS OFF AUTOMATICALLY.

KEEP CHARGER VENTILATION OPENINGS CLEAR. POOR VENTILATION CAN DAMAGE CHARGER.

BATTERIES CHARGED IN UNHEATED AREAS (BELOW 65° F) SHOULD BE CHARGED AS SOON AFTER USE AS POSSSIBLE. CHARGE BATTERIES ONCE EACH WEEK FOR FOUR HOURS IN TEMPERATURE ABOVE 65° F TO IMPROVE STATE OF CHARGE AND BATTERY LIFE.



819936

WARNING

PROVIDE BATTERY VENTILATION DURING CHARGING. KEEP OPEN FLAMES OR SPARKS AWAY FROM BATERIES AT ALL TIMES. DO NOT SHORT ACROSS BATTERIES TO CHECK CONDITION OF BATTERIES. BATTERIES MAY EXPLODE. BATTERY ACID CAN CAUSE SEVERE DAMAGE TO EYES, SKIN, AND CLOTHING FLUST CONTAMINATED AREA IMMEDIATELY WITH WATER. WHEN CLANING BATTERIES, KEEP SOLUTION AND WATER AWAY FROM CHARGER AND SWITCHES.

819936

FORWARD

NEUTRAL

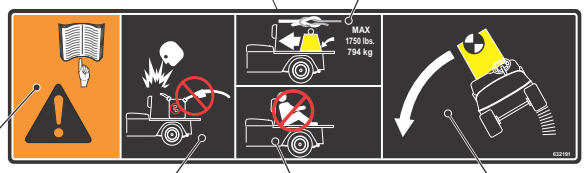
REVERSE

832080

832080 BETWEEN SEATS

Secure load as far forward as possible MAX weight 1750 lbs or 794 kg

632191



WARNING Read the manual

Danger of explosion DO NOT fill fuel can on load bed.

Do not ride on deck

Load with high center of gravity may cause tip over

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

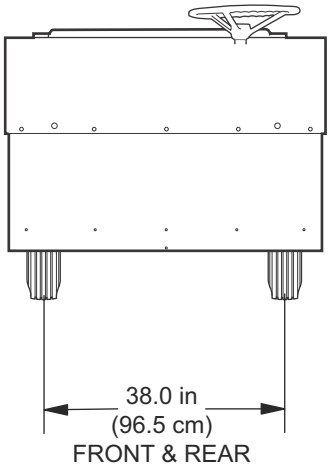
Notes:

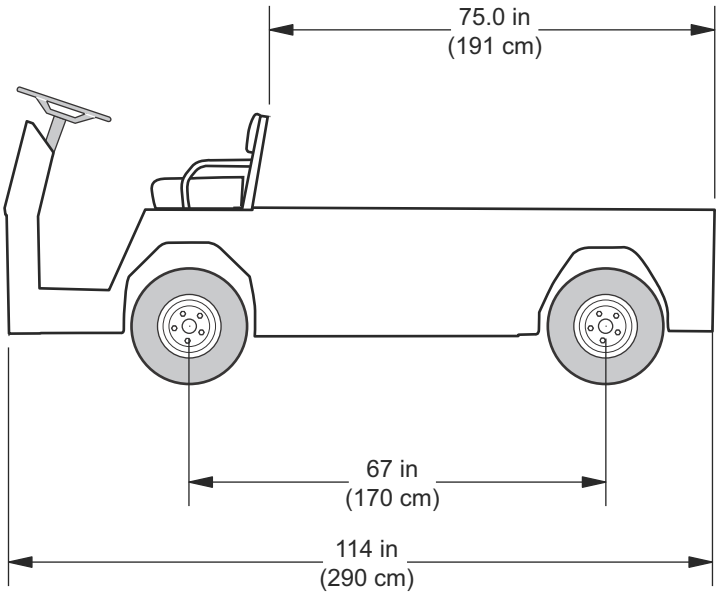
GENERAL SPECIFICATIONS

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

TITLE	PAGE NO.
VEHICLE DIMENSIONS	2-2
VEHICLE RAMP, SIDE SLOPE and TURNING DIAMETER	2- 3
TITAN LD 2 PASSENGER VEHICLE SPECIFICATIONS	2-4

41.5 in
(105 cm)


38.0 in
(96.5 cm)
FRONT & REAR


75.0 in
(191 cm)
67 in
(170 cm)
114 in
(290 cm)

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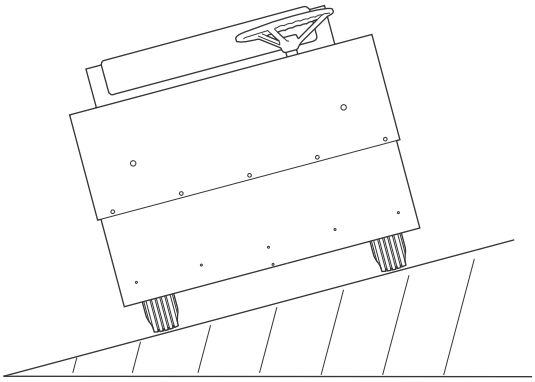
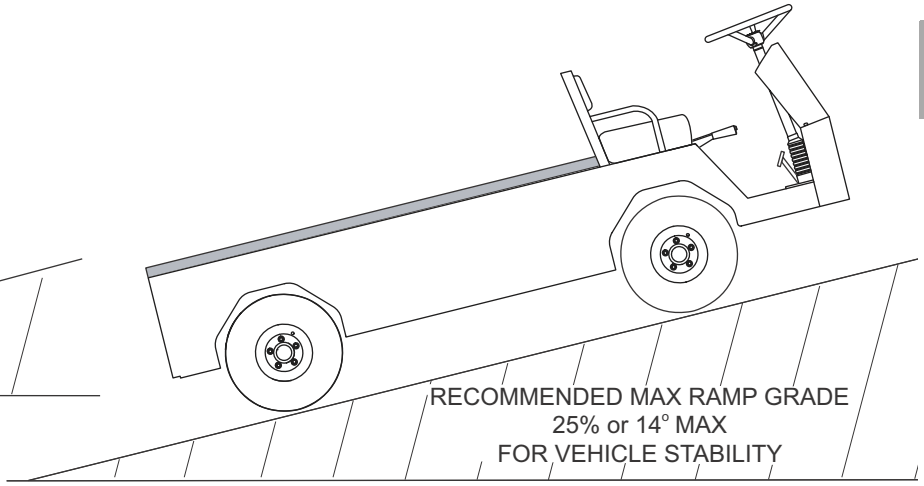
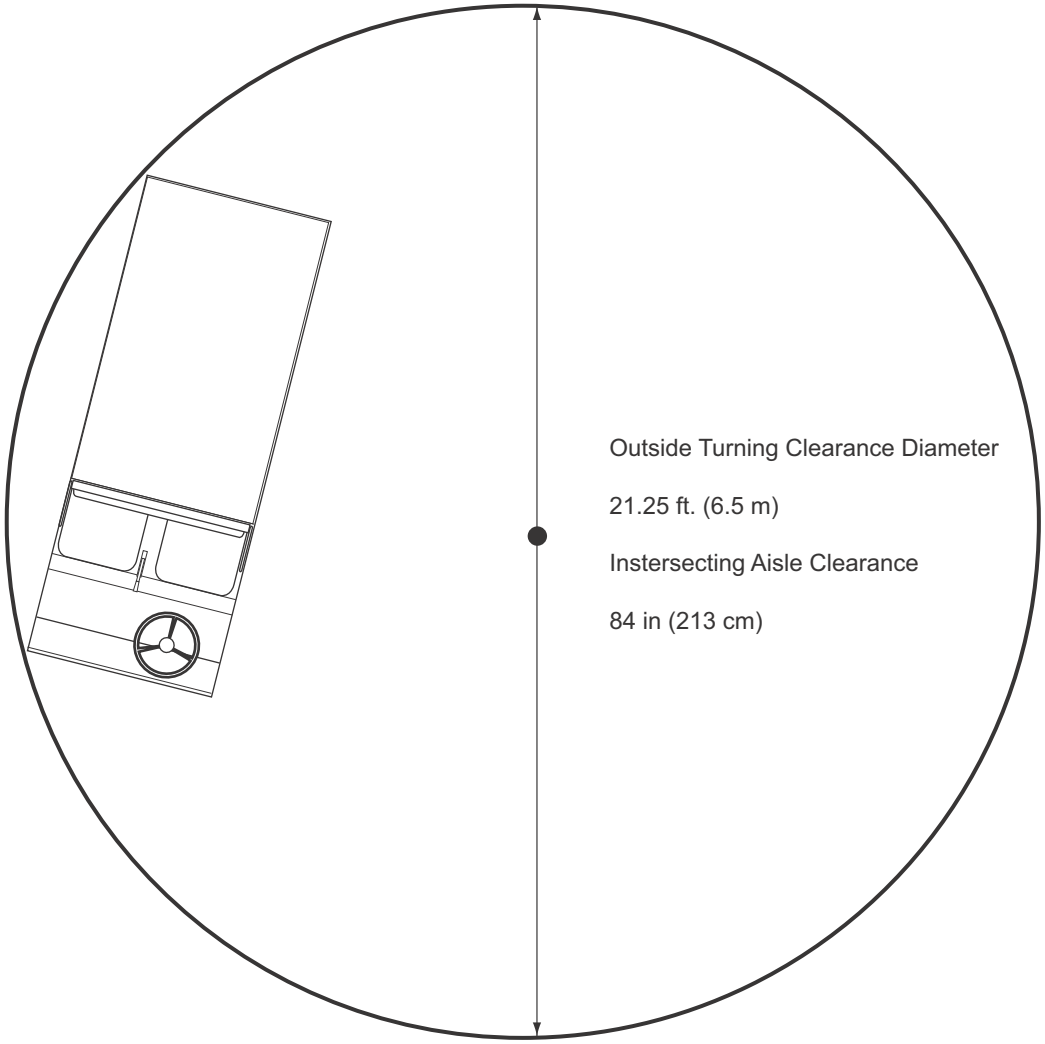


RECOMMENDED MAX SIDE TILT
25% or 14° MAX
FOR VEHICLE STABILITY



RECOMMENDED MAX RAMP GRADE
25% or 14° MAX
FOR VEHICLE STABILITY



CUSHMAN

MODEL: TITAN LD 2 Passenger
TYPE: 36 VOLT ELECTRIC POWERED
MODEL YEAR: 2013
Part No: 631803

PRODUCT SPECIFICATION

CONFIGURATION HIGHLIGHTS

Battery Charger: On-board, fully line compensating. Underwriters Laboratories. (U.L.) Listed, (C.S.A. Certified)

- Input: 110 – 120 Volt, 60 Hz, 10.5 amp
- Output: 36 VDC at 21 amps. 10.5 amp @ 120 VAC

Motor: 36 Volt DC series wound, brazed armature, solid copper windings. Vented 8 hp (6 kW) @ 1600 rpm
Drive Train: Direct motor shaft connected to transaxle pinion shaft
Electrical System: 36 Volt DC, six, 6 volt deep cycle batteries (115 minute minimum, 225 amp-hour @ 20 hr. discharge rate)
Transaxle: Differential with helical gears
Brakes: Dual rear wheel hydraulic 7 in (18 cm) self-adjusting drum brakes. Mechanical hand operated park brake
Cargo Bed: Plywood 75 in x 41 in (191 x 105 cm). Lifts for access to powertrain.
Capacity: Seating for 2 persons

PRODUCT OVERVIEW

Dimensions	
Overall Length	114.0 in (290 cm)
Overall Width	44.0 in (112 cm)
Overall Height (Steering Whl)	46.0 in (117 cm)
Overall Height (Optional Cab)	72.0 in (183 cm)
Wheel Base	66.0 in (168 cm)
Front Wheel Track	37 in (94 cm)
Rear Wheel Track	37 in (94 cm)
Gnd Clearance @ Differential	5 in (13 cm)
Cargo Deck Width	41.5 in (105 cm)
Cargo Deck Length	75.0 in (191 cm)
Cargo Deck Load Height	28.5 in (72.3 cm)
Cargo Deck Material	Heavy Duty Plywood
Vehicle Power	
Power Source	36 Volts DC
Motor Type	Series Wound
Horsepower (kW)	8.0 hp (6 kW) @ 1600 rpm
Electrical System	36 Volt
Batteries (Qty, Type)	Six, 6 Volt Deep Cycle
Key or Pedal Start	Pedal Start
Battery Charger	36 V On-Board, 120 VAC, UL & CSA
Speed Controller	Solid State 400 Amp Rated
Drive Train	Motor Shaft Direct Drive
Transaxle	Differential with Helical Gears
Gear Selection	Center Console Forward-Neutral-Reverse
Rear Axle Ratio	14.76:1

Performance	
Capacity	2 Persons
Dry Weight	1105 lb (502 kg)
Curb Weight	1475 lb (670 kg)
Cargo Deck Load Capacity	1750 lb (795 kg)
Vehicle load capacity	2150 lb (977 kg)
Outside Clearance Circle	22.0 ft (6.7 m)
Intersecting Aisle Clearance	84.0 in (213 cm)
Speed (Level Ground)	13 mph ± 0.5 mph (21 kph ± 0.8 kph)
Steering & Suspension	
Steering	Worm Gear
Front Suspension	Independent, Transverse Leaf Spring, Shocks
Rear Suspension	Leaf Springs
Service Brake	Rear Wheel Hydraulic Drum.
Parking Brake	Hand Operated Mechanical
Front Tire	5.70 x 8 (Load Range C)
Rear Tires	5.70 x 8 (Load Range C)
Body & Chassis	
Frame & Body	Welded steel with DuraShield™ powder coat
Body & Finish	Diamond plate ptn. Polyester primer + acrylic
Standard Color	Yellow

Some items shown may be optional equipment

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

Notes:

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

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TITLE **PAGE NO.**

OPERATOR CONTROLS AND FEATURES 3-2

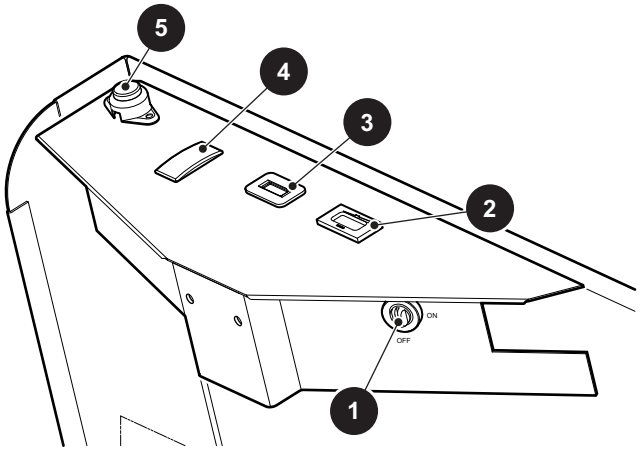
Key Switch 3-2
Headlight Switch 3-2
Direction Selector 3-2
12 Volt Accessory Outlet 3-2
State of Charge Meter 3-2
Hour Meter 3-2
Brake Light 3-2
Horn 3-2
Turn Signal Switch 3-2
Hazard Lights 3-2
Accelerator Pedal 3-3
Brake Pedal 3-3
Park Brake 3-3
Brake master cylinder 3-3
Cup Holder 3-3
Glove Box 3-3
Run-Tow/Maintenance/Storage switch 3-3
Fuse Block 3-3
Fold Down Seat 3-4
Operator Present Switch 3-4
Tie Down Slots 3-4
Type EE Latches 3-4
Emergency Stop Switch 3-4

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

OPERATOR CONTROLS AND FEATURES

1. Key Switch / Light Switch

Located on the dash panel, this switch enables the basic electrical system of the vehicle to be turned on and off by turning the key. To prevent inadvertent operation of the vehicle when left unattended, the key should be turned to the OFF position and removed. If the vehicle is equipped with lights the key switch has a position to operate them, indicated by a light icon.



2. State of Charge Meter

The vehicle is equipped with a state of charge meter located in the dash panel. The state of charge meter indicates the amount of usable power in the batteries, with ‘F’ indicating a full charge on the battery pack and ‘E’ indicating the battery pack needs to be charged.

3. Hour Meter (if equipped)

Located in the dash panel, the hour meter indicates the total hours of operation.

4. Switch Blank

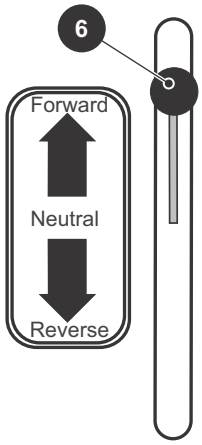
An opening for an accessory switch is coverd with a removable plug.

5. Horn

The horn is operated by pushing the horn button located in the dash panel.

6. Direction Selector

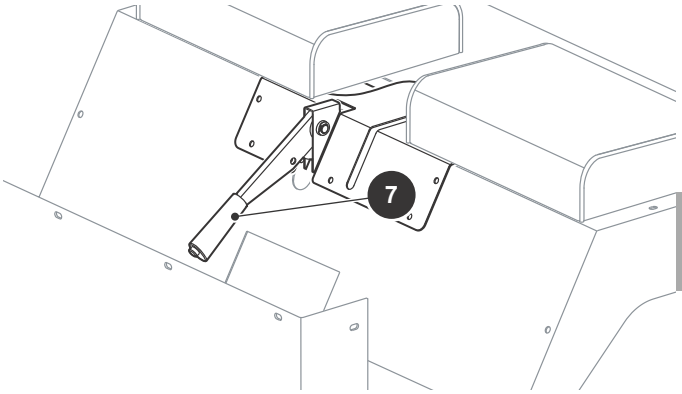
Located on the dash panel, this switch permits the selection of either F (forward), R (reverse) or N (neutral, the position between forward and reverse). Vehicle should be left in neutral with the parking brake engaged and the key removed when unattended. This vehicle is equipped with an operator present switch and will shutdown if the operator leaves the vehicle seat without turning the key to off; to restart the vehicle after this, the direction selector must be set to N and then back to the desired direction before pressing the accelerator pedal.



Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

7. Park Brake

The hand operated park brake is located between the driver and passenger seats. The brake is engaged when the handle is raised and disengaged when the handle is parallel to the panel. When leaving the vehicle unattended, engage the park brake by raising the handle until it is locked in place. To release the park brake push in on the button at the end of the handle and rotate the handle downward.

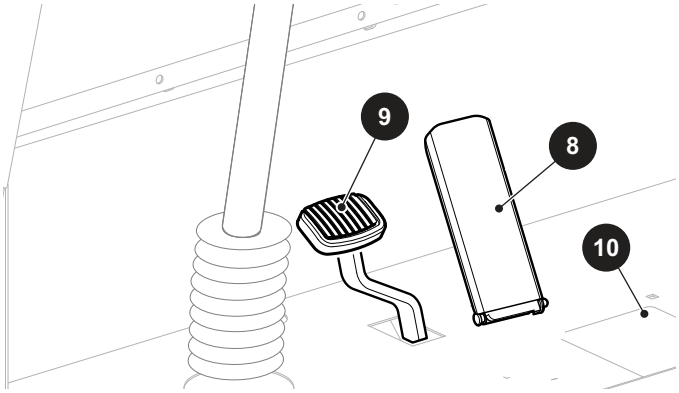


8. Accelerator Pedal

Accelerator Pedal controls the vehicle speed; with the key switch ON, the operator seated and the vehicle in F or R depressing the pedal will cause the vehicle to move. Releasing the pedal will slow the vehicle and eventually stop, to stop the vehicle more quickly, depress the brake pedal.

9. Brake Pedal

Depress the brake pedal to slow or stop the vehicle. The vehicle is equipped with hydraulic drum brakes on the rear wheels.



10. Brake Master Cylinder

The brake master cylinder is located under the access plate in the floor. The fluid level must be maintained between the MIN and MAX lines on the master cylinder.

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

Notes:

OPERATING PROCEDURES

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

TITLE **PAGE NO.**

SERIAL NUMBER LOCATION 4-2

Serial and Manufacturing Number Label 4-2

Serial Number Bar Code Label 4-2

BEFORE INITIAL USE 4-2

ON-BOARD CHARGER 4-3

OPERATING THE VEHICLE 4-4

PERFORMANCE 4-5

Speed Control 4-5

STARTING AND DRIVING 4-6

Starting Vehicle on a Hill 4-6

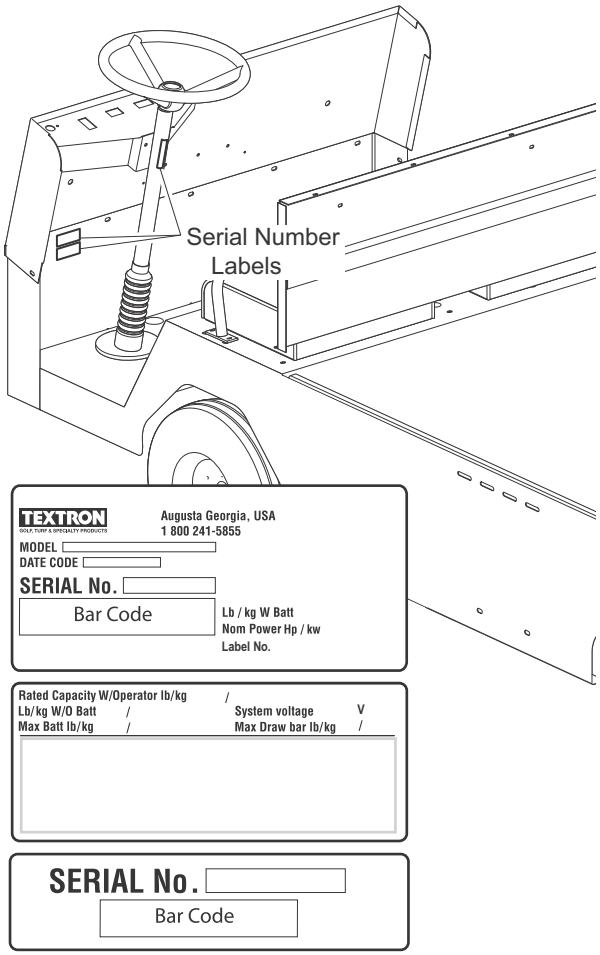
Coasting 4-6

LABELS AND PICTOGRAMS 4-6

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

SERIAL NUMBER LOCATION

There are serial number labels in several locations on the vehicle. Design changes take place on an ongoing basis. In order to obtain correct components for the vehicle, the manufacture date code, serial number and vehicle model must be provided when ordering parts.



Serial and Manufacturing Number Label

Supplemental Information Label is located on the lower dash panel on the driver's side. This label contains the vehicle type if applicable, the Model, Date Code, Serial Number, Gross Vehicle Weight (GVW), Vehicle Weight with Batteries and Nominal Horse Power.

A secondary Supplemental Information Label is located just below Part A. This label contains the Rated Capacity With Operator, Vehicle Weight Without Batteries, Maximum Battery Weight, System Voltage and Maximum Draw Bar Weight.

Serial Number Bar Code Label

A smaller label containing the Serial Number and a Bar Code is located on the steering column.

BEFORE INITIAL USE

Read and follow the safety label on the instrument panel. Be sure you understand how to operate the vehicle, its equipment as well as how to use it safely. Maintaining good, safe performance depends to a large extent on the operator.

⚠ WARNING

Hydrogen gas is generated as a natural part of the lead acid battery charging process. A 4% concentration of hydrogen gas is explosive and could cause severe injury or death. Charging must take place in an area that is adequately ventilated (minimum of 5 air exchanges per hour).

To reduce the chance of battery explosion that could result in severe injury or death, never smoke around or charge batteries in an area that has open flame or electrical equipment that could cause an electrical arc.

Hydrogen gas is generated in the charging cycle of batteries and is explosive in concentrations as low as 4%. Because hydrogen gas is lighter than air, it will collect in the ceiling of buildings necessitating proper ventilation. Five air exchanges per hour is considered the minimum requirement.

Never charge a vehicle in a hazardous area or area that is subject to flame or spark. Pay particular attention to natural gas or propane gas water heaters and furnaces.

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

Before a new vehicle is put into operation, the items shown in the ***INITIAL SERVICE CHART*** must be performed.

The vehicle batteries must be fully charged before initial use.

Check for leaks that could have developed in shipment from the factory.

Check for correct tire inflation. See GENERAL SPECIFICATIONS.

Check the operation of the vehicle brakes, including the parking brake, make adjustments if necessary. Check the hydraulic brake fluid level in the master cylinder.

ITEM	SERVICE OPERATION
Batteries	Charge batteries
Seats	Remove protective plastic covering
Brakes	Check operation, adjust if necessary
	Check hydraulic brake fluid level
Tires	Check air pressure (see SPECIFICATIONS)

INITIAL SERVICE CHART

Remove the protective clear plastic from the seat bottom and back rest before placing the vehicle in service

ON-BOARD CHARGER

⚠ DANGER

Risk of electric shock. Connect charger power cord to an outlet that has been properly installed and grounded in accordance with all local codes and ordinances. A grounded outlet is required to reduce risk of electric shock – do not use ground adapters or modify plug. Do not touch uninsulated battery terminal.

Do not open or disassemble charger. Do not operate charger if the AC supply cord is damaged or if the charger has received a sharp blow, or otherwise damaged in any way – refer all repair work to qualified personnel. Not for use by children.

⚠ WARNING

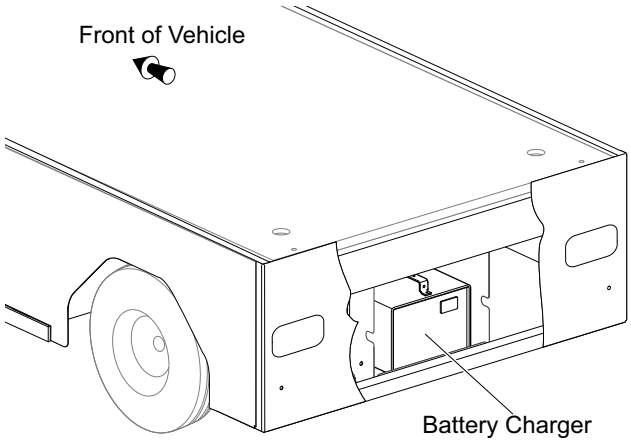
To prevent a physical hazard that could result in an electrical shock or electrocution, be sure that the charger plug is not damaged and is inserted fully into a grounded receptacle.

The power (AC) cord is equipped with a grounded plug. Do not attempt to pull out, cut or bend the ground post.

Never charge the vehicle in a hazardous environment.

The on-board charger is located under the cargo deck at the rear of the vehicle, it is wired directly to the batteries. Before charging the batteries park the vehicle in a well ventilated area, set the parking brake, turn the key switch to OFF and remove the key. Pull charger out the charger cord and plug into a dedicated 15 amp AC outlet to start the charger.

When the charging cycle is complete, disconnect the charger cord and replace it in the storage area provided.



Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

OPERATING THE VEHICLE

⚠ CAUTION

Improper use of the vehicle or the lack of proper maintenance may result in decreased performance or damage to the vehicle.

Read the following warnings before attempting to operate the vehicle.

⚠ WARNING

To reduce the possibility of severe injury or death resulting from loss of vehicle control, the following warnings must be observed:

When driving vehicle, consider the terrain, traffic conditions and the environmental factors which effect the terrain and the ability to control the vehicle.

Use extra care and reduced speed when driving on poor surfaces, such as loose dirt, wet grass, gravel, etc.

Avoid extremely rough terrain.

Maintain a safe speed when driving down hill. Use service brake to control speed when traveling down an incline. A sudden stop or change of direction may result in loss of control.

Slow down before and during turns. All turns should be made at reduced speed.

All travel should be directly up or down hills.

Use extra care when driving the vehicle across any incline.

⚠ WARNING

Stay in designated areas and avoid steep slopes. To reduce the possibility of severe injury or death resulting from improper vehicle operation, the following warnings must be observed:

Refer to GENERAL SPECIFICATIONS for seating capacity.

Make sure that the direction selector is in correct position before attempting to move the vehicle.

Do not take vehicle out of gear by moving the direction selector to Neutral while in motion (coasting).

Check the area behind vehicle before operating in reverse.

Always bring vehicle to a complete stop before shifting the direction selector.

Always remain seated and hold on while vehicle is in motion. Keep feet, legs, hands and arms inside vehicle at all items.

To prevent inadvertent movement when vehicle is left unattended, engage the parking brake, move direction selector to neutral, turn key to OFF and remove the key.

On steep hills, it is possible for vehicles to coast at faster than normal speeds that may be encountered on a flat surface. to prevent loss of vehicle control speeds should be limited to no more than the maximum speed on level ground (see GENERAL SPECIFICATION). Limit speed by releasing the accelerator and applying the foot brake. Severe damage to the drive train components due to excessive speed may result from driving the vehicle above specified speed. Damage caused by excessive speed may cause a loss of control, is costly, is considered abuse and will not be covered under warranty.

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

PERFORMANCE

NOTICE

Vehicles operate only when the Run - Tow/Maintenance/Storage switch is in the RUN position.

The vehicle's top speed is sensed and regulated directly by the controller and the feature to slow the vehicle when the accelerator pedal is up is mild.

Speed Control

⚠ WARNING

To prevent the possibility of loss of control that could cause severe injury or death, use service brake to control speed. The Speed control system is not a substitute for the service brake.

Speed control system vehicles are equipped with a regenerative motor control system.

Example: If all of the following events occur...

a) the vehicle is being driven down a slope
b) the vehicle attempts to exceed the specified top speed with the accelerator pedal depressed **or** released

the regenerative braking will limit the speed of the vehicle to the specified top speed (the warning beeper will **not** sound). When the regenerative braking system is activated by this sequence of events, the motor generates power which is returned to the batteries.

STARTING AND DRIVING

⚠ WARNING

To reduce the possibility of roll-back which could result in severe injury or vehicle damage, do not release the service brake until motor has started.

All vehicles are equipped with an *interlock system* that disables the controller and prevents the vehicle from being operated or moved while the charger is connected. Disconnect the charger cord from the receptacle and properly store the cord prior to moving the vehicle.

To operate the vehicle:

- Apply the pressure to the brake pedal, place the key in the key switch and turn it to the ON position.
- Move the direction selector to the direction desired.
- Release the park brake.
- Slowly depress the accelerator pedal to start the motor. Release the brake pedal when the motor starts.
- When the accelerator pedal is released, the motor controls the deceleration. To stop the vehicle more quickly, depress the **service brake pedal**.

NOTICE

When the direction selector is in the reverse position, a warning signal will sound to indicate that the vehicle is ready to run in reverse.

Starting Vehicle On A Hill

⚠ WARNING

To reduce the possibility of roll-back which could result in severe injury or vehicle damage, do not release the service brake until motor has started

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

⚠ CAUTION

Do not hold vehicle on hill by using accelerator and motor. Leaving motor in a stalled condition for more than 3 - 4 seconds will cause permanent damage to motor.

To reduce the possibility of permanent damage to the drive system, it is important to prevent excessive roll-back when starting the vehicle on a hill.

Place left foot on brake pedal and release the park brake. Depress accelerator with right foot and release the brake pedal by lifting the left foot.

Coasting

⚠ WARNING

To reduce the possibility of severe injury or death from coasting at above recommended speeds, limit speed with service brake.

Uncontrolled coasting does not occur with this model. However, this is not a substitute for the service brake which should be used to slow the speed of the vehicle quickly.

NOTICE

This model is equipped with a feature (pedal-up braking) that slows the vehicle's speed when the accelerator pedal is released until the vehicle stops.

LABELS AND PICTOGRAMS

Vehicles may be labeled with pictograms as a method of conveying information or warnings. The SAFETY Section of this manual explains the labels that are used on this vehicle.

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

Notes:

Notes:

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

TITLE	PAGE NO.
VEHICLE CLEANING AND CARE	**5-3**
Vehicle Cleaning	5-3
REPAIR	**5-4**
Lifting the Vehicle	5-4
WHEELS AND TIRES	**5-5**
Tire Repair	5-5
Wheel Installation	5-6
LIGHT BULB REPLACEMENT	**5-6**
Headlight and Front Turn Signal	5-6
Tail/Brake Light	5-7
FUSE REPLACEMENT	**5-7**
TRANSPORTING VEHICLE	**5-7**
Towing	5-7
Hauling	5-7
SERVICE AND MAINTENANCE	**5-7**
ROUTINE MAINTENANCE	**5-8**
Tire Inspection	5-9
BRAKES	**5-9**
Periodic Brake Test For Hydraulic Brakes	5-9
REAR AXLE	**5-9**
Checking the Lubricant Level	5-9
LUBRICATION	**5-10**
CAPACITIES AND REPLACEMENT PARTS	**5-10**
HARDWARE	**5-10**
PERIODIC SERVICE SCHEDULE	**5-11**
BATTERY CHARGING AND MAINTENANCE	**5-12**
Safety	5-12
Battery Disposal	5-12
Battery	5-12
Battery Maintenance	5-13
At Each Charging Cycle	5-13
Monthly	5-13
Electrolyte Level and Water	5-13
Battery Cleaning	5-16

Battery Replacement 5-17
Prolonged Storage 5-18
Battery Charging 5-18
AC Voltage 5-19
Troubleshooting 5-19
HYDROMETER 5-19
Using Hydrometer 5-20

VEHICLE CLEANING AND CARE

Vehicle Cleaning

⚠ WARNING

To reduce the possibility of severe injury or vehicle damage, read and understand all instructions supplied by manufacturer of pressure washer.

⚠ CAUTION

When pressure washing exterior of vehicle, do not use pressure in excess of 700 psi (4800 kPa). To reduce the possibility of cosmetic damage, do not use any abrasive or reactive solvents to clean plastic parts.

It is important that proper techniques and cleaning materials be used. Using excessive water pressure may cause severe injury to operator or bystander, damage to seals, plastics, seat material, body finish or electrical system. Do not use pressure in excess of 700 psi (4800 kPa) to wash exterior of vehicle.

Normal cleaning of vinyl seats and plastic or rubber trim requires the use of a mild soap solution applied with a sponge or soft brush and wipe with a damp cloth.

Removal of oil, tar, asphalt, shoe polish, etc. will require the use of a commercially available vinyl/rubber cleaner.

The painted surfaces of the vehicle provide attractive appearance and durable protection. Frequent washing with lukewarm or cold water and mild detergent is required to preserve the painted surfaces.

Occasional cleaning and waxing with non-abrasive products designed for ‘clear coat’ automotive finishes will enhance the appearance and durability of the painted surfaces.

Corrosive materials used as fertilizers or for dust control can collect on the underbody of the vehicle. These materials will cause corrosion of underbody parts unless flushed occasionally with plain water. Thoroughly clean any areas where mud or other debris can collect. Sediment packed in closed areas should be loosened to ease it’s removal, taking care not to chip or otherwise damage paint.

REPAIR

Some servicing operations may require the front wheels, the rear wheels, or the entire vehicle to be raised.

⚠ WARNING

To reduce the possibility of severe injury or death from a vehicle falling from a jack:

Be sure the vehicle is on a firm and level surface.

Never get under a vehicle while it is supported by a jack.

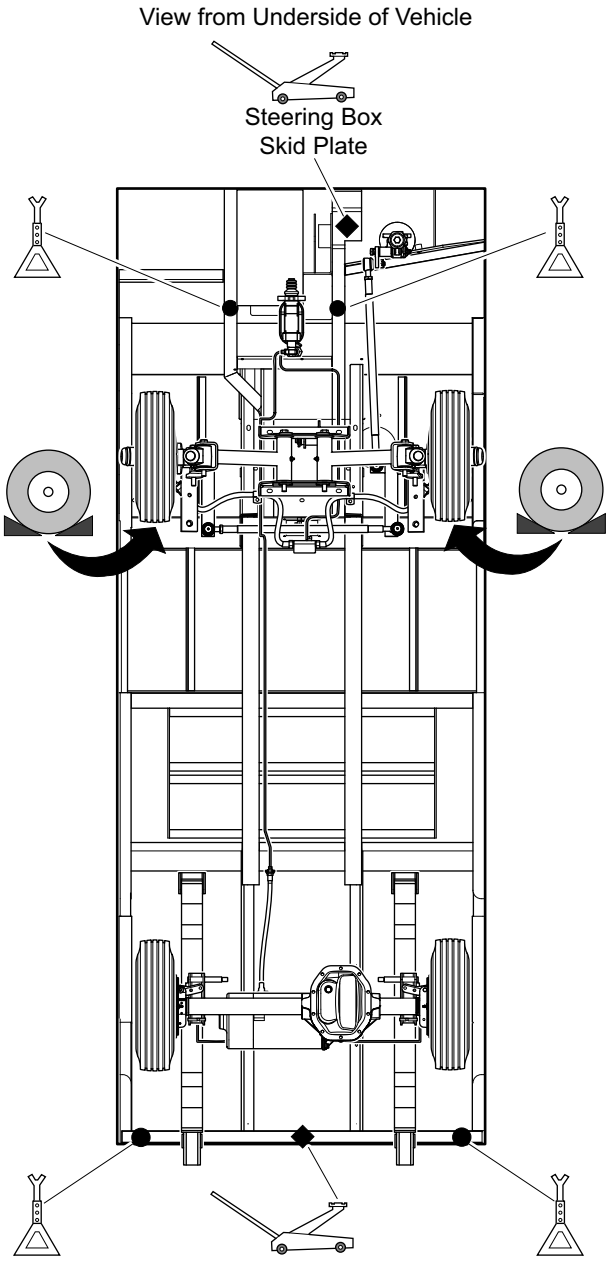
Use jack stands and test the stability of the vehicle on the stands.

Always place chocks in front and behind the wheels not being raised.

Use extreme care since the vehicle is extremely unstable during the lifting process.

⚠ CAUTION

When lifting the vehicle, position the jacks and jack stands at the areas indicated only.



Lifting The Vehicle

Tool List	Qty.	Tool List	Qty.
Floor Jack	1		
Jack Stands	4		
Wheel Chocks	4		

Remove payload from vehicle before lifting. No person(s) should be in or on the vehicle while lifting.

To raise the entire vehicle, install chocks in front and behind each front wheel. Center the jack under the rear frame crossmember. Raise the vehicle enough to place a jack stand under the outer ends of the rear frame crossmember.

Lower the jack and test the stability of the vehicle on the two jack stands.

Place the jack at the flat section of the steering box skid plate. Raise the vehicle enough to place jack stands under the frame members as indicated.

Lower the jack and test the stability of the vehicle on all four jack stands.

If only the front or rear of the vehicle is to be raised, place the chocks in front and behind each wheel not being raised to stabilize the vehicle.

Lower the vehicle by reversing the lifting sequence.

WHEELS AND TIRES

⚠ WARNING

A tire explosion can cause severe injury or death. Never exceed the inflation pressure rating on the tire sidewall.

To reduce the possibility of tire explosion, pressurize tire with small amounts of air applied intermittently to seat beads. Due to the low volume of the small tires, overinflation can occur in seconds. Never exceed the tire manufacturer's recommendation when seating a bead. Protect face and eyes from escaping air when removing a valve core.

To reduce the possibility of severe injury caused by a broken socket when removing wheels, use only sockets designed for impact wrench use.

Use caution when inflating tires. Overinflation could cause the tire to separate from the wheel or cause the tire to explode, either of which could cause severe injury.

Tire Repair

Tool List	Qty.	Tool List	Qty.
Lug Wrench, 3/4"	1	Impact Socket, 3/4"	1
Impact Wrench	1	Torque Wrench, ft. lbs.	1

Use caution when inflating tires. Due to the low volume of the small tires, overinflation can occur in seconds. Overinflation could cause the tire to separate from the wheel or cause the tire to explode.

Tire inflation should be determined by the condition of the terrain. See GENERAL SPECIFICATIONS section for recommended tire inflation pressure. For outdoor applications with major use on grassy areas, the following should be considered. On hard turf, it is desirable to have a **slightly** higher inflation pressure. On very soft turf, a lower pressure reduces the possibility of tires cutting into the turf. For vehicles being used on paved or hard surfaces, tire inflation pressure should be in the higher allowable range, but under no condition should inflation pressure be higher than recommended on tire sidewall. **All four tires** should have the same pressure for optimum handling characteristics. Be sure to install the valve stem dust cap after checking or inflating.

The vehicle is fitted with low pressure tubeless tires mounted on one piece rims; therefore, the most cost effective way to repair a puncture in the tread is to use a commercial tire plug.

NOTICE

Tire plug tools and plugs are available at most automotive parts outlets and have the advantage of not requiring the tire be removed from the wheel.

If the tire is flat, remove the wheel and inflate the tire to the maximum recommended pressure for the tire. Immerse the tire in water to locate the leak and mark with chalk. Insert tire plug in accordance with manufacturer's instructions.

⚠ WARNING

To reduce the possibility of severe injury, be sure the mounting/demounting machine is anchored to floor. Wear OSHA approved safety equipment when mounting/demounting tires.

If the tire is to be removed or mounted, the tire changing machine manufacturer's recommendations must be followed in order to reduce possibility of severe injury.

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

Wheel Installation

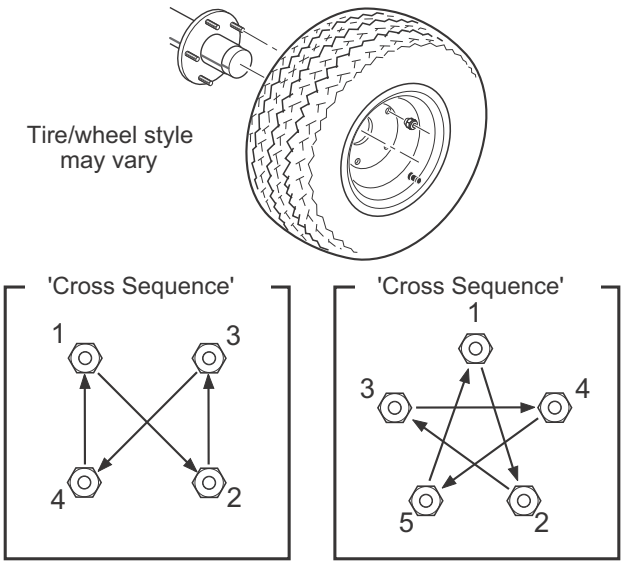
⚠ CAUTION

To reduce the possibility of component damage, do not tighten lug nuts to more than 85 ft. lbs. (115 Nm) torque.

NOTICE

It is important to follow the 'cross sequence' pattern when installing lug nuts. This will assure even seating of the wheel against the hub.

With the valve stem to the outside, mount the wheel onto the hub with lug nuts. Finger tighten the lug nuts (1) in a 'cross sequence' pattern. Tighten the lug nuts to 50 to 85 ft. lbs. (68 to 115 Nm) torque in 20 ft. lbs. (27 Nm) increments following the 'cross sequence' pattern.

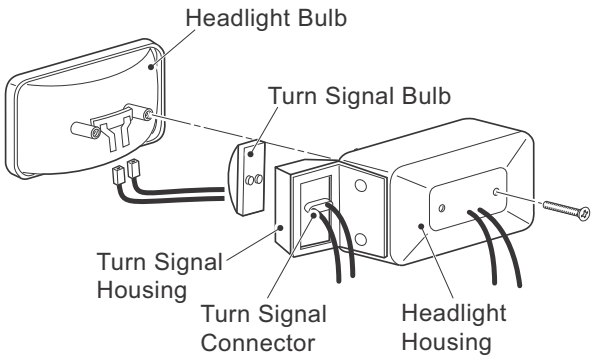


LIGHT BULB REPLACEMENT

Headlight and Front Turn Signal

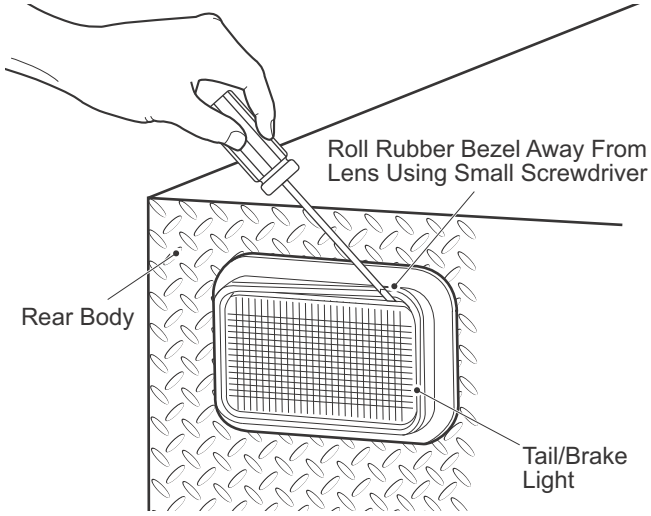
For vehicles with headlights (Ref Fig. 10 on page 10), Remove the two screws on rear of the headlight. Remove screws, pull headlight out and disconnect wires. Connect wires to new headlight. Installation is the reverse of disassembles.

To replace the turn signal light bulb, remove connector from rear of bulb and lens. Unsnap bulb and lens from housing. Install new bulb and lens by snapping into housing. Install connector.



Tail/Brake Light

To replace the tail and brake light bulb, insert a small screwdriver between the rubber bezel and the taillight lens. Roll the rubber bezel from around the edge of the lens and remove. Install replacement bulb and replace lens.



FUSE REPLACEMENT

To replace fuses, remove the load bed and remove the controller cover. Locate the fuse block in the electrical box adjacent to the controller. Pull out old fuse and replace with a new automotive type fuse of the correct size.

FUSE #	SIZE	FOR	PART NUMBER
1	32V 15AMP	Horn / Reverse Warning Indicator	35212G01
2	32V 15AMP	Headlights / Tail Lights	35212G01
3	32V 15AMP	Turn Signals / Brake Lights	35212G01

TRANSPORTING VEHICLE

Towing

⚠ WARNING

This vehicle is NOT designed to be towed.

It is recommended that the vehicle be moved by placing the entire vehicle on a trailer, flat bed truck or other suitable transport.

Hauling

⚠ WARNING

To reduce the possibility of severe injury or death while transporting the vehicle:

Secure the vehicle and contents.

Never ride on the vehicle being transported.

Always check that the vehicle and contents are adequately secured before transporting. The rated capacity of the trailer or truck must exceed the weight of the vehicle (see GENERAL SPECIFICATIONS for vehicle weight) and load plus 1000 lbs. (454 kg). Set the park brake and secure the vehicle using ratchet tie downs.

SERVICE AND MAINTENANCE

⚠ WARNING

To reduce the possibility of severe injury or death from improper servicing techniques:

DO NOT attempt any type of servicing operations before reading all notes, cautions and

warnings in this manual.

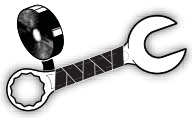
Any servicing requiring adjustments to be made to the powertrain while the motor is running must be made with both drive wheels raised and vehicle properly supported on jack stands.

To reduce the possibility of motor damage, never operate vehicle at full throttle for more than 4 - 5 seconds while vehicle is in a 'no load' condition.

Reduce the possibility of accidental starting by disconnecting battery at negative terminal before servicing.

Wear eye protection when working on the vehicle. Use extra care when working around batteries, or using solvents or compressed air.

To reduce the possibility of causing an electrical arc, which could result in a battery explosion, turn off all electrical loads from the battery before removing battery wires.



Wrap wrenches with vinyl tape to reduce the possibility of a dropped wrench 'shorting out' a battery, which could result in an explosion.

The electrolyte in a battery is an acid solution which can cause severe burns to the skin and eyes. Treat all electrolyte spills to the body and eyes with extended flushing with clear water. Contact a physician immediately.

Any electrolyte spills should be neutralized with a solution of 2 teaspoons (10 ml) sodium bicarbonate (baking soda) dissolved in 1 quart (1 liters) of water and flushed with water.

Aerosol containers of battery terminal protectant must be used with extreme care. Insulate metal container to reduce the possibility of can contacting battery terminals which could result in an explosion.

It is in the best interest of both vehicle owner and service technician to carefully follow the procedures recommended in this manual. Preventative maintenance, applied at recommended intervals, is the best guarantee for keeping the vehicle both dependable and economical.

This vehicle will give years of satisfactory service, providing it receives regular maintenance. Refer to the Periodic Service Schedule for appropriate service intervals. Refer to Lubrication Points for appropriate lubrication locations.

⚠ CAUTION

To prolong vehicle life, some maintenance items must be serviced more frequently on vehicles used under severe driving conditions such as extreme temperatures, extreme dust/debris conditions, frequent use with maximum load.

To access powertrain for routine maintenance, lift and remove load deck. For major repair, refer to appropriate Technician's Repair and Service Manual.

Some service procedures may require the vehicle to be lifted. Refer to LIFTING THE VEHICLE for proper lifting procedure and safety information.

ROUTINE MAINTENANCE

⚠ CAUTION

To prolong vehicle life, some maintenance items must be serviced more frequently on vehicles used under severe driving conditions such as extreme temperatures, extreme dust/debris conditions, or frequent use with maximum load.

To access the powertrain for routine maintenance, remove the load bed. For major repair, refer to the appropriate Technician's Repair and Service Manual.

Some service procedures may require the vehicle to be lifted. Refer to LIFTING THE VEHICLE for proper lifting procedure and safety information.

Tire Inspection

Tire condition should be inspected per the Periodic Service Schedule. Inflation pressures should be checked when the tires are cool. Be sure to install the valve dust cap after checking or inflating.

BRAKES

⚠ WARNING

To reduce the possibility of severe injury or death, always evaluate pedal travel before operating a vehicle to verify some braking function is present.

All driving brake tests must be done in a safe location with regard for the safety of all personnel.

NOTICE

Over time, a subtle loss of performance may take place; therefore, it is important to establish the standard with a new vehicle.

The Periodic Brake Performance Test should be performed regularly as an evaluation of braking system performance. It is useful as a method of identifying subtle loss of performance over time.

Periodic Brake Test For Hydraulic Brakes

Depress the brake pedal; the pedal should have some free travel and then become hard. A brake pedal that has no free travel, excessive free travel or a spongy feel indicates that a brake inspection is required. A brake pedal that fails after it is applied indicates a leak in the master or wheel cylinders.

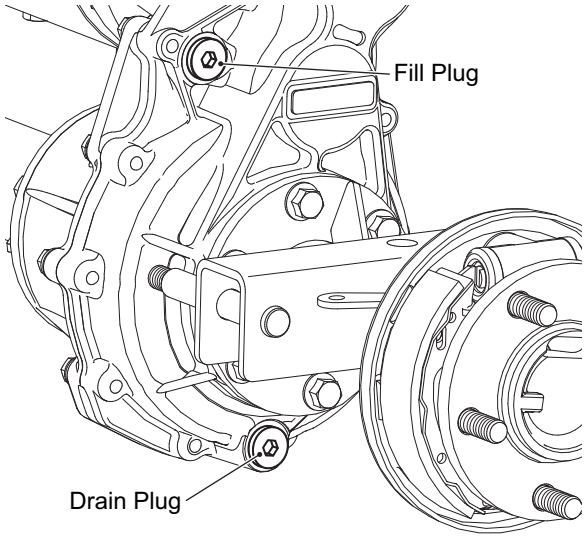
It is important to periodically check and maintain proper brake fluid levels in the brake master cylinder. The fill cap for the master cylinder is located under the access panel in the front floorboard. When checking the fluid, wipe off any dirt from the fill cap before removing it to reduce the possibility of contamination. Fluid level should be maintained between the MAX and MIN fill lines. If fluid must be added, inspect the system for fluid leaks.

REAR AXLE

The only maintenance required for the first five years is the periodic inspection of the rear axle for lubricant leakage. Unless leakage is evident, the lubricant need only be replaced after five years. Refer to the Service and Repair Manual for the fluid replacement procedure.

Checking The Lubricant Level

There is no way to check the level of fluid in the rear axle. If leakage is noticed, the fluid will need to be drained completely. Install the drain plug and refill with 13.8 ounces (410 ml) of 80W90 GL5 and install the fill plug.



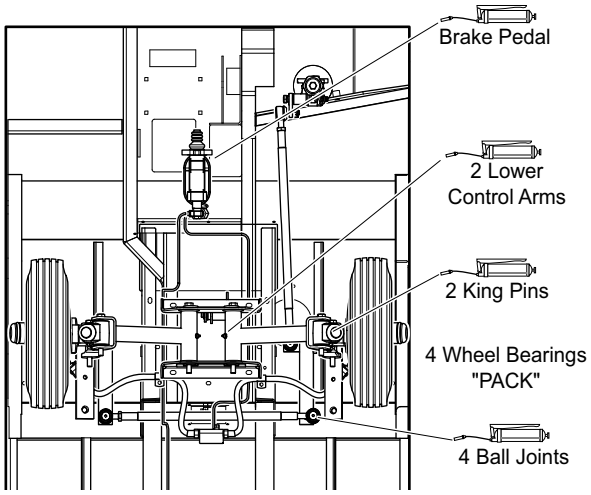
Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

LUBRICATION

⚠ CAUTION

Do not use more than three (3) pumps of grease in any grease fitting at any one time. Excess grease may cause grease seals to fail or grease migration into areas that could damage components.

Putting more than three pumps of grease in a grease fitting could damage grease seals and cause premature bearing failure.



CAPACITIES AND REPLACEMENT PARTS

Rear Axle Oil	40 oz. (1.2 liters) Mobil 424
Fuses	see section on FUSES
Headlight Bulb	P/N 74004G01
Marker Bulb	P/N 74005G01
Turn Signal Bulb	P/N 74006G01
Tail/Brake Light	P/N 21759G1

Capacities and Replacement Parts

HARDWARE

Generally, three classes of standard hardware and two classes of metric hardware are used in the vehicle. Grade 5 hardware can be identified by the three marks on the hexagonal head and grade 8 hardware is identified by 6 marks on the head. Metric hardware is marked on the head with 8.8 or 10.9. Unmarked hardware is Grade 2.

Periodically, the vehicle should be inspected for loose fasteners. Fasteners should be tightened with care and in accordance with the Torque Specifications table or as specified in the Repair and Service Manual for this vehicle.

ALL TORQUE FIGURES ARE IN FT. LBS. (Nm)
Unless otherwise noted in text, tighten all hardware in accordance with this chart.
This chart specifies 'lubricated' torque figures. Fasteners that are plated or lubricated when installed are considered 'wet' and require approximately 80% of the torque required for 'dry' fasteners.

BOLT SIZE	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	3/4"	7/8"	1"
Grade 2	4 (5)	8 (11)	15 (20)	24 (33)	35 (47)	55 (75)	75 (102)	130 (176)	125 (169)	190 (258)
Grade 5	6 (8)	13 (18)	23 (31)	35 (47)	55 (75)	80 (108)	110 (149)	200 (271)	320 (434)	480 (651)
Grade 8	6 (8)	18 (24)	35 (47)	55 (75)	80 (108)	110 (149)	170 (230)	280 (380)	460 (624)	680 (922)
BOLT SIZE	M4	M5	M6	M8	M10	M12	M14			
Class 5.8 (Grade 2)	1 (2)	2 (3)	4 (6)	10 (14)	20 (27)	35 (47)	55 (76.4)			
Class 8.8 (Grade 5)	2 (3)	4 (6)	7 (10)	18 (24)	35 (47)	61 (83)	97 (131)			
Class 10.9 (Grade 8)	3 (4)	6 (8)	10 (14)	25 (34)	49 (66)	86 (117)	136 (184)			

Torque Specifications and Bolt Grades

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

PERIODIC SERVICE SCHEDULE

✓ - CHECK **C&A** - CHECK & ADJUST **CL** - CLEAN **R** - REPLACE

REMARKS	before each use DAILY	WEEKLY	100 miles/160 kms MONTHLY	300 miles/500 kms QUARTERLY	600miles/1000 kms SEMI-ANNUAL	1200miles/2000 kms ANNUAL	5 YEARS	PAGE
Tires - pressure, condition of tires & rims	✓	✓	✓	✓	✓	✓		
Hardware - loose or missing	✓	✓	✓	✓	✓	✓		
Reverse Warning Indicator	✓	✓	✓	✓	✓	✓		
Brake/Tail Lights, Headlights (if equipped) all lights operational	✓	✓	✓	✓	✓	✓		
Overall Vehicle Condition	✓	✓	✓	✓	✓	✓		
Battery Pack - state of charge, condition, loose terminals, corrosion, hold down & hardware	✓	✓	CL	CL	CL	CL		
Brake Pedal - smooth operation	✓	✓	✓	✓	✓	✓		
Brakes - check fluid level in master cylinder						✓		
Brakes - aggressive stop test			C&A	C&A	C&A	C&A		
Park Brake - operation, does it hold on a hill	✓	✓	C&A	C&A	C&A	C&A		
Accelerator - smooth operation	✓	✓	✓	✓	✓	✓		
Charger - inspect charger AC cord and plug at each charge	✓	✓	✓	✓	✓	✓		
Wiring - loose connections, broken or missing insulation			✓	✓	✓	✓		
Steering Assembly - excessive play, loose or missing hardware			✓	✓	✓	✓		
Tie Rods - excessive play, bent rods, loose or missing hardware			✓	✓	✓	✓		
Rear Axle - fluid level, oil leakage, noise, loose or missing hardware			✓	✓	✓	✓		
Rear Axle - drain & replace fluid							R	
Rear Suspension - shock oil leakage, worn bushings, loose or missing hardware				✓	✓	✓		
Front Suspension - strut oil leakage, excessive play in hubs or kingpins, worn bushings, loose or missing hardware			✓	✓	✓	✓		
Front Wheel Alignment - unusual tire wear				C&A	C&A	C&A		

NOTE: Some maintenance items must be serviced more frequently on vehicles used under severe driving conditions.

BATTERY CHARGING AND MAINTENANCE

Safety

Always observe the following warnings when working on or near batteries.

⚠ WARNING

To prevent battery explosion that could result in severe personal injury or death, keep all smoking materials, open flames or sparks away from the batteries.

Hydrogen gas is formed when charging batteries. Do not charge batteries without adequate ventilation. A 4% concentration of hydrogen gas is explosive.

5

Be sure that the key switch is off and all electrical accessories are turned off before starting work on the vehicle.

Never disconnect a circuit under load at a battery terminal.

Batteries are heavy. Use proper lifting techniques when moving them. Always lift the battery with a commercially available battery lifting device. Use care not to tip batteries when removing or installing them; spilled electrolyte can cause burns and damage.

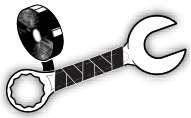
The electrolyte in a storage battery is an acid solution which can cause severe burns to the skin and eyes. Treat all electrolyte spills to the body and eyes with extended flushing with clear water. Contact a physician immediately.

Always wear a safety shield or approved safety goggles when adding water or charging batteries.

Any electrolyte spills should be neutralized with a solution of 1/4 cup (60 ml) sodium bicarbonate (baking soda) dissolved in 1 1/2 gallons (6 liters) of water and flushed with water.

Overfilling batteries may result in electrolyte being spilled from the battery during the charge cycle. Expelled electrolyte may cause damage to the vehicle and storage facility.

Aerosol containers of battery terminal protectant must be used with extreme care. Insulate metal container to prevent can from contacting battery terminals which could result in an explosion.



Wrap wrenches with vinyl tape to prevent the possibility of a dropped wrench from shorting out a battery, which could result in an explosion and severe personal injury or death.

Never charge a vehicle in a hazardous location or atmosphere. Reference NFPA 505 for definitions of hazardous and non-hazardous locations.

Battery Disposal

Lead-acid batteries are recyclable. Return whole scrap batteries to distributor, manufacturer or lead smelter for recycling. For neutralized spills, place residue in acid-resistant containers with absorbent material, sand or earth and dispose of in accordance with local, state and federal regulations for acid and lead compounds. Contact local and/or state environmental officials regarding disposal information.

Battery

A battery is defined as two dissimilar metals immersed in an acid. If the acid is absent or if the metals are not dissimilar, a battery has not been created. The batteries most commonly used in these vehicles are lead acid.

A battery does not store electricity, but is able to produce electricity as the result of a chemical reaction which releases stored chemical energy in the form of electrical energy. The chemical reaction takes place faster in warm conditions and slower in cold conditions. Temperature is important when conducting tests on a battery and test results must be corrected to compensate for temperature differences.

As a battery ages, it still performs adequately except that its **capacity** is diminished. Capacity describes the time that a battery can continue to provide its design amperes from a full charge.

A battery has a maximum life, therefore good maintenance is designed to maximize the **available** life and reduce the factors that can reduce the life of the battery.

Battery Maintenance

Tool List	Qty.
Insulated Wrench, 9/16”	1
Battery Carrier	1
Hydrometer	1
Battery Maintenance Kit P/N 25587-G01	1
Battery Protective Spray	1

At Each Charging Cycle

⚠ WARNING

To reduce the possibility of fire, never charge a battery pack that is to be unattended beyond the normal charging cycle. Overcharging could cause damage to the vehicle batteries and result in extreme overheating. The charger should be checked after 24 hours and unplugged after the charge cycle is complete.

Before charging the batteries, inspect the cord of the battery charger for missing or cracked insulation, inspect the plug to be sure the grounding prong is intact.

Charge the batteries after each day’s use.

Monthly

- Inspect all wiring for fraying, loose terminations, corrosion or deterioration of insulation.
- Check that the electrolyte level is correct and add suitable water as required.
- Clean the batteries and wire terminations.
- Coat battery terminals with commercially available protectant.

Electrolyte Level and Water

The correct level of the electrolyte is 1/2" (13 mm) above the plates in each cell.

This level will leave approximately 1/4" - 3/8" (6 - 10 mm) of space between the electrolyte and the vent tube. The electrolyte level is important since any portion of the plates exposed to air will be ruined beyond repair. Also avoid filling with too much water, which will result in electrolyte being forced out of the battery due to gassing and a decrease in volume of the electrolyte that results from the charging cycle.

⚠ CAUTION

DO NOT overfill batteries. The charging cycle will expel electrolyte and result in component damage.

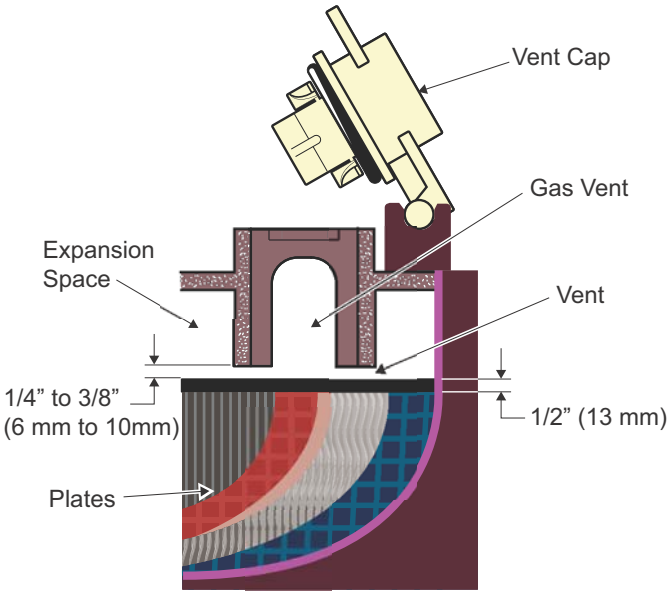
A battery being charged will'gas' with the majority of the gassing taking place at the end of the charging cycle. This gas is hydrogen with is lighter than air. Water and sulphuric acid droplets will be carried out of the battery vents by the hydrogen gas, however, this loss is minimal. If the battery electrolyte level is too high, the electrolyte will block the vent tube and the gas will force it out of the vent tube and battery cap. The water will evaporate but the sulphuric acid will remain where it can damage vehicle components and the storage facility floor. Sulphuric acid loss will weaken the concentration of acid within the electrolyte and reduce the life of the battery.

Over the life of the battery, a considerable amount of water is consumed. It is important that the water used be pure and free of contaminants that could reduce the life of the battery by reducing the chemical reaction. The water must be distilled or purified by an efficient filtration system. Water that is not distilled should be analyzed and, if required, filtration installed to permit the water to meet the requirements of the water purity table.

Even if the water is colorless, odorless, tasteless and fit for drinking, the water should be analyzed to see that it does not exceed the impurity levels specified in the table.

Impurity	Parts Per Million
Color	Clear
Suspended	Trace
Total Solids	100
Calcium & Magnesium Oxides	40
Iton	5
Ammonia	8
Organic & Volatile Matter	50
Nitrites	5
Nitrates	10
Chloride	5

Water Purity Table



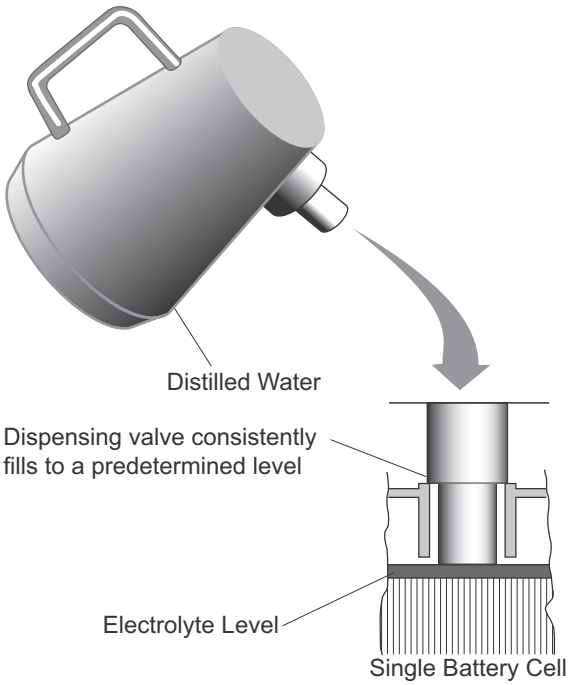
Electrolyte level should be at least 1/2" (13mm) above the plates and 1/4" to 3/8" (6 to 10 mm) below vent

Correct Electrolyte Level

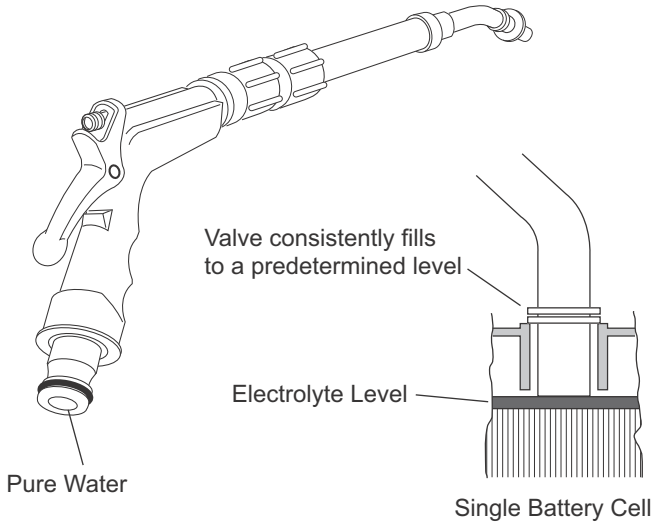
Automatic watering devices such as the one included in the Battery Maintenance Kit (P/N 25587-G01) can be used with an approved water source. These watering devices are accurate, easy to use and allow for rapid filling. They also maintain the correct electrolyte level within the battery cells.

NOTICE

The watering device should only be used if the electrolyte level is less than 1/2" (13 mm) above top of plates.



Hand Held Watering Device



Automatic Watering Gun

WARNING

The electrolyte in a storage battery is an acid solution which can cause severe burns to the skin and eyes. Treat all electrolyte spills to the body and eyes with extended flushing with clear water. Contact a physician immediately.

Any electrolyte spills should be neutralized with a solution of 1/4 cup (60 ml) sodium bicarbonate (baking soda) dissolved in 1 1/2 gallons (6 liters) of water and flushed with water.

Always wear a safety shield or approved safety goggles when adding water or charging batteries.

Battery Cleaning

⚠ CAUTION

To prevent battery damage, be sure that all battery caps are tightly installed.

To reduce the possibility of damage to vehicle or floor, neutralize acid before rinsing battery.

To reduce the possibility of damage to electrical components while cleaning, do not use a pressure washer.

Cleaning should take place per the Periodic Service Schedule.

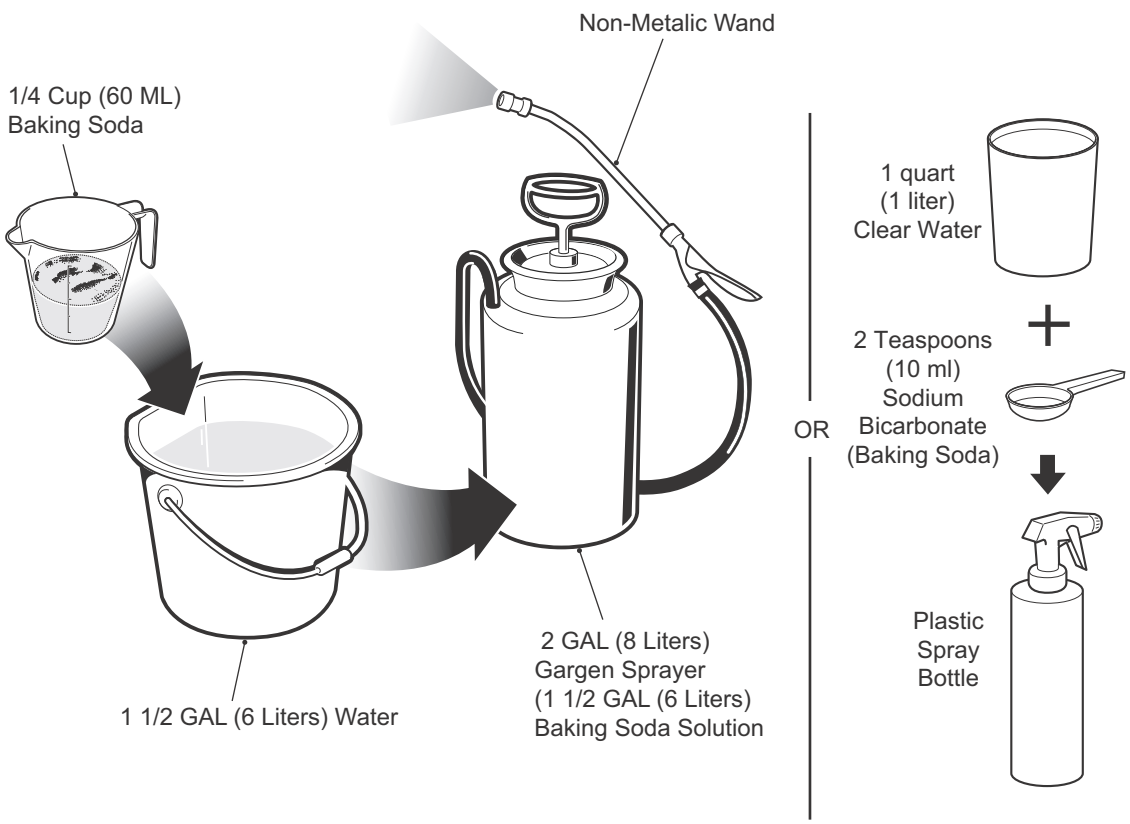
When cleaning the outside of the batteries and terminals, do not use a water hose without first spraying the batteries with a solution of baking soda (sodium bicarbonate) and water to neutralize any acid deposits. Use of a water hose without first neutralizing the acid will move the acid from the top of the batteries to another area of the vehicle or storage facility, where it will attack the metal structure or the concrete/asphalt floor. After hosing down the batteries, a residue will be left on the batteries which is conductive and will contribute to the discharge of the batteries.

NOTICE

To reduce the possibility of battery explosion that could result in severe injury or death, do not use metallic spray wand to clean battery and keep all smoking materials, open flame or sparks away from the battery.

The correct cleaning technique is to spray the top and sides of the batteries with a solution of baking soda and water. This solution is best applied with a garden-type sprayer equipped with a non-metallic spray wand or plastic spray bottle. The solution should consist of 1/4 cup (60 ml) of baking soda mixed with 1 1/2 gallons (6 litres) of clear water. In addition to the batteries special attention should be paid to metallic components adjacent to the batteries, these should also be sprayed with the baking soda solution.

Allow the solution to set for at least three minutes; use a soft bristle brush or cloth to wipe the tops of the batteries in order to remove any residue that could cause the self-discharge of the battery. Rinse the entire area with low pressure clear water. All of the items required for complete battery cleaning and watering are contained in the Battery Maintenance Kit (P/N 25587-G01).



Preparing Acid Neutralizing Solution

Cleaning should take place once a month or more often under extreme conditions. After batteries are clean and dry, the terminals should be coated with a commercially available protectant. **Aerosol containers of battery terminal protectant must be used with extreme care. Insulate the metal container to prevent the can from contacting the battery terminals.**

Battery Replacement

Remove battery hold downs and cables. Lift out batteries with a commercially available lifting device.

If the batteries have been cleaned and any acid in the battery rack area neutralized as recommended, no corrosion to the battery racks or surrounding area should be present. Any corrosion found should be immediately removed with a putty knife and a wire brush. The area should be washed with a solution of sodium bicarbonate (baking soda) and water and thoroughly dried before priming and painting with a corrosion resistant paint.

The batteries should be placed into the battery racks and the battery hold downs tightened to 45 - 55 in. lbs. (5 - 6 Nm) torque, to prevent movement but not tight enough to cause distortion of the battery cases.

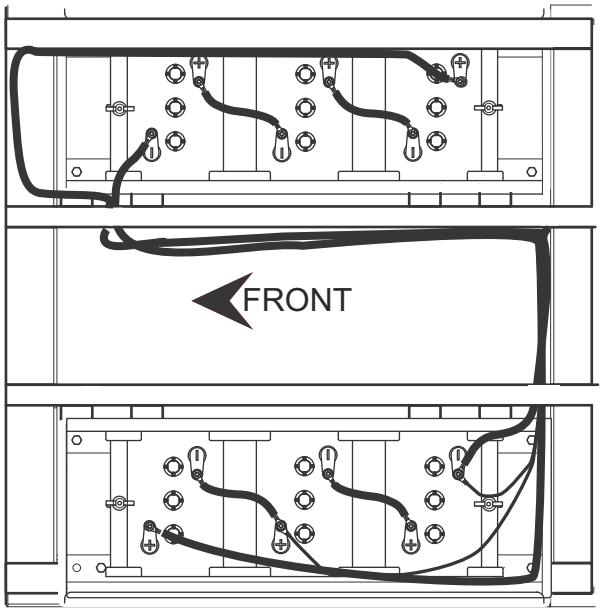
Inspect all wires and terminals. Clean any corrosion from the battery terminals or the wire terminals with a solution of sodium bicarbonate (baking soda) and brush clean if required.

⚠ WARNING

To prevent battery explosion that could result in severe personal injury or death, extreme care must be used with aerosol containers of battery terminal protectant. Insulate the metal container to prevent the metal can from contacting battery terminals which could result in an explosion.

Use care to connect the battery wires as shown.

Tighten the battery post hardware to 90 - 100 in. lbs. (10 - 11 Nm) torque. Do not over-torque the terminal stud nut, this will cause a “mushroom” effect on the battery post which will prevent the terminal nut from being properly tightened.



Protect the battery terminals and battery wire terminals with a commercially available coating.

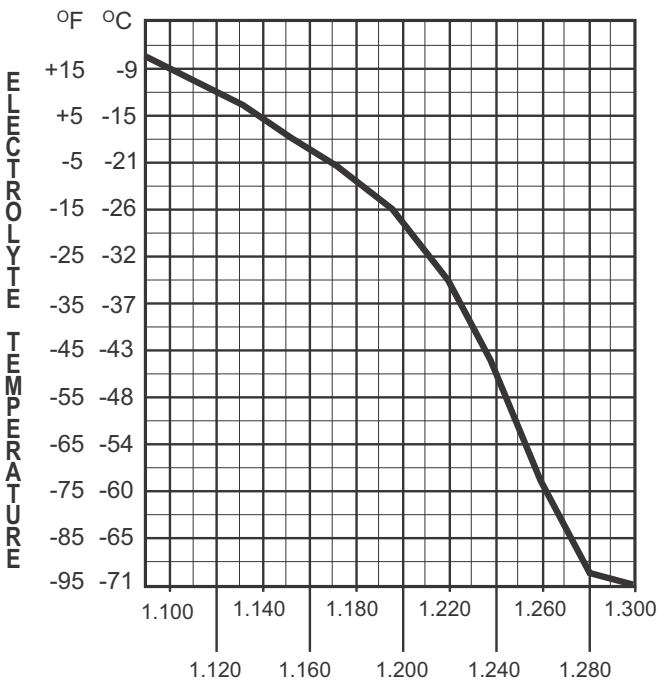
Prolonged Storage

⚠ CAUTION

Battery charger, controller and other electronic devices need to be disconnected since they will contribute to the premature discharge of batteries.

During periods of storage, the batteries will need attention to keep them maintained and prevent discharge. In high temperatures the chemical reaction is faster, while low temperatures cause the chemical reaction to slow down. A vehicle that is stored at 90° F (32° C) will lose.002 of specific gravity each day. If a fully charged battery has a specific gravity of 1.275, and the battery is allowed to sit unused, it will become partially discharged. When it reaches 1.240, which it will do in less than twenty days, it should be recharged. If a battery is left in a discharged state, sulfating takes place on and within the plates. This condition is not reversible and will cause permanent damage to the battery. In order to prevent damage, the battery should be recharged. A hydrometer can be used to determine the specific gravity and therefore the state of charge of a battery.

In winter conditions, the battery must be fully charged to prevent the possibility of freezing. A fully charged battery will not freeze in temperatures above -75° F (-60° C). Although the chemical reaction is slowed in cold temperatures, the battery must be stored fully charged, and disconnected from any circuit that could discharge the battery. For on-board chargers, disconnect the charging harness from the batteries. For portable chargers, disconnect the charging plug from the vehicle receptacle. The batteries must be cleaned and all deposits neutralized and removed from the battery case to prevent self discharge. The batteries should be tested or recharged at thirty day minimum intervals.



SPECIFIC GRAVITY ELECTROLYTE FREEZING POINT

Battery Charging

The battery charger is designed to fully charge the battery set. If the batteries are severely deep cycled, some automatic battery chargers contain an electronic module that may not activate and the battery charger will not function. Automatic chargers will determine the correct duration of charge to the battery set and will shut off when the battery set is fully charged. Always refer to the instructions of the specific charger used.

Before charging, the following should be observed:

⚠ CAUTION

Do not overfill batteries. The charging cycle will expel electrolyte and result in component damage.

- The electrolyte level in all cells must be at the recommended level and cover the plates.
- The charging must take place in a non-hazardous area that is well ventilated and capable of removing the hydrogen gas that is generated by the charging process. A **minimum** of five air exchanges per hour is recommended.
- The charging connector components must be in good condition and free from dirt or debris.
- The charger connector must be fully inserted into the vehicle receptacle.
- The charger connector/cord set is protected from damage and is located in an area to prevent injury that may result from personnel running over or tripping over the cord set.
- The charger is automatically turned off during the connect/disconnect cycle and therefore no electrical arc is generated at the DC plug/receptacle contacts.

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

NOTICE

In some portable chargers, there will be a rattle present in the body of the charger DC plug. This rattle is caused by an internal magnet contained within the charger plug. The magnet is part of the interlock system that prevents the vehicle from being driven when the charger plug is inserted in the vehicle charging receptacle.

AC Voltage

Battery charger output is directly related to the input voltage. If multiple vehicles are receiving an incomplete charge in a normally adequate time period, low AC voltage could be the cause and the power company should be consulted.

Troubleshooting

In general, troubleshooting will be done for two distinct reasons. First, a battery that performs poorly and is outside of the manufacturers specification should be identified in order to replace it under the terms of the manufacturer's warranty. Different manufacturers have different requirements. Consult the battery manufacturer or the manufacturer's representative for specific requirements.

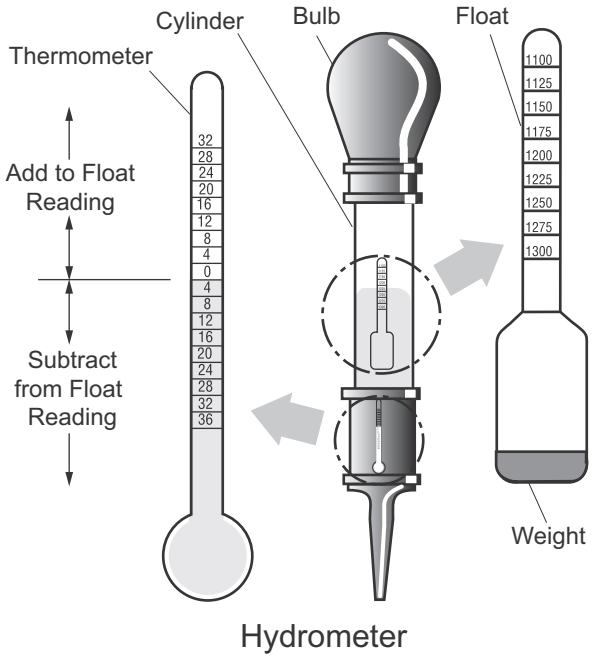
The second reason is to determine why a particular vehicle does not perform adequately. Performance problems may result in a vehicle that runs slowly or in a vehicle that is unable to operate for the time required.

A new battery must **mature** before it will develop its maximum capacity. Maturing may take up to 100 charge/discharge cycles. After the maturing phase, the older a battery gets, the lower the capacity. The only way to determine the capacity of a battery is to perform a load test using a discharge machine following manufacturer's recommendations.

A cost effective way to identify a poorly performing battery is to use a hydrometer to identify a battery in a set with a lower than normal specific gravity. Once the particular cell or cells that are the problem are identified, the suspect battery can be removed and replaced. At this point there is nothing that can be done to salvage the battery; however, the individual battery should be replaced with a good battery of the same brand, type and approximate age.

HYDROMETER

A hydrometer (P/N 608903) is used to test the state of charge of a battery cell. This is performed by measuring the density of the electrolyte, which is accomplished by measuring the specific gravity of the electrolyte. The greater the concentration of sulfuric acid, the more dense the electrolyte becomes. The higher the density, the higher the state of charge.



Hydrometer

⚠ WARNING

To prevent battery explosion that could result in severe personal injury or death, never insert a metal thermometer into a battery. Use a hydrometer with a built in thermometer that is designed for testing batteries.

Specific gravity is the measurement of a liquid that is compared to a baseline. The baseline is water which is assigned a base number of 1.000. The concentration of sulfuric acid to water in a new golf car battery is 1.280 which means that the electrolyte weighs 1.280 times the weight of the same volume of water. A fully charged battery will test at 1.275 - 1.280 while a discharged battery will read in the 1.140 range.

NOTICE

Do not perform a hydrometer test on a battery that has just been watered. The battery must go through at least one charge and discharge cycle in order to permit the water to adequately mix with the electrolyte.

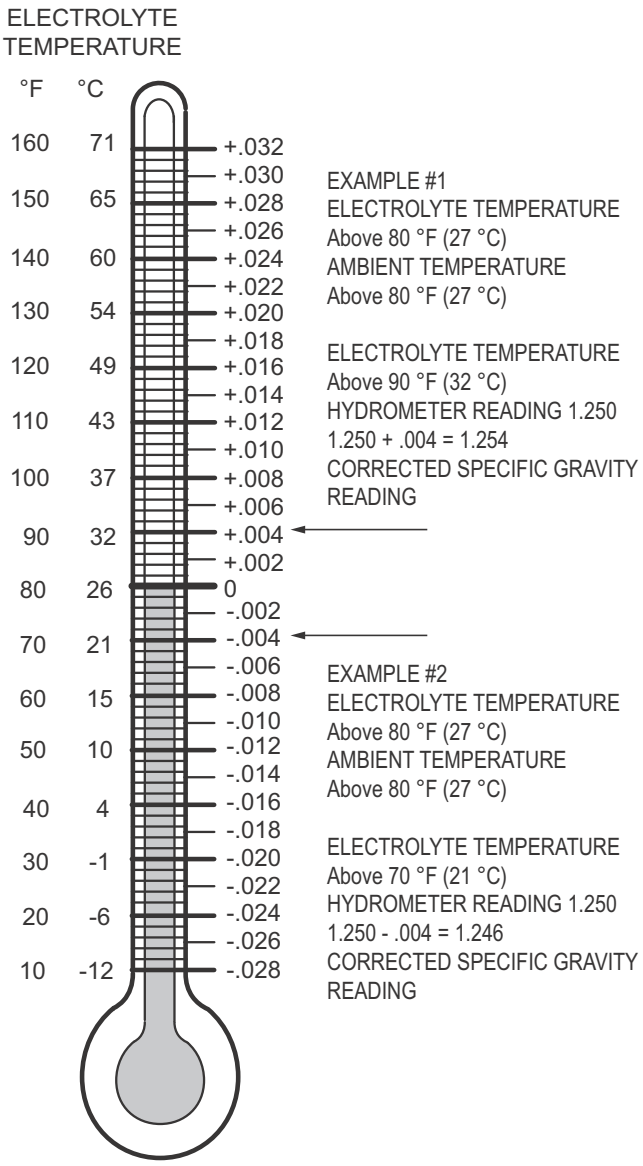
The temperature of the **electrolyte** is important since the hydrometer reading must be corrected to 80° F (27° C). High quality hydrometers are equipped with an internal thermometer that will measure the temperature of the electrolyte and will include a conversion scale to correct the float reading. It is important to recognize that the electrolyte temperature is significantly different from the ambient temperature if the vehicle has been operated.

Using A Hydrometer

1. Draw electrolyte into the hydrometer several times to permit the thermometer to adjust to the electrolyte temperature and note the reading. Examine the color of the electrolyte. A brown or gray coloration indicates a problem with the battery and is a sign that the battery is nearing the end of its life.
2. Draw the minimum quantity of electrolyte into the hydrometer to permit the float to float freely without contacting the top or bottom of the cylinder.
3. Hold the hydrometer in a vertical position at eye level and note the reading where the electrolyte meets the scale on the float.
4. Add or subtract four points (.004) to the reading for every 10° F (6° C) the electrolyte temperature is above or below 80° F (27° C). Adjust the reading to conform with the electrolyte temperature, e.g., if the reading indicates a specific gravity of 1.250 and the electrolyte temperature is 90° F (32° C), add four points (.004) to the 1.250 which gives a corrected reading of 1.254. Similarly if the temperature was 70° F (21° C), subtract four points (.004) from the 1.250 to give a corrected reading of 1.246.
5. Test each cell and note the readings (corrected to 80° F or 27° C). A variation of fifty points between any two cell readings (example 1.250 - 1.200) indicates a problem with the low reading cell(s).

As a battery ages the specific gravity of the electrolyte will decrease at full charge. This is not a reason to replace the battery providing all cells are within fifty points of each other.

Since the hydrometer test is in response to a vehicle exhibiting a performance problem, the vehicle should be recharged and the test repeated. If the results indicate a weak cell, the battery or batteries should be removed and replaced with a good battery of the same brand, type and approximate age.



Hydrometer Temperature Correction

Read all of this manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notices, Cautions, Warnings, and Dangers.

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Notes:

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International:	Phone: 001-706-798-4311, FAX: 001-706-771-4609

Service Parts Manuals, as well as Repair and Service Manuals
are available from a local Distributor, an authorized Branch,
Genuine E-Z-GO Parts & Accessories Department or at www.shopezgo.com.

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